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VOL. XXXIII.

1865.

ARMY MEDICAL DEPARTMENT.

STATISTICAL,
SANITARY, AND MEDICAL
REPORTS.

Volume V.

For the Year 1863.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY HARRISON AND SONS,
FOR HER MAJESTY'S STATIONERY OFFICE.
1865.

TO THE RIGHT HONOURABLE

THE SECRETARY OF STATE FOR WAR.

MY LORD,

IN accordance with instructions laid down for the conduct of business by the Director-General and Heads of Branches of the Army Medical Department, I have the honour to submit the accompanying Reports on the Health of the Army in 1863, and on various matters connected with the duties of the Officers of the Department.

I have the honour to be,

My Lord,

Your Lordship's most obedient

Humble Servant,

J. B. GIBSON,

Director-General.

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STATISTICAL REPORT

ON THE

HEALTH OF THE ARMY IN 1863.

BY

T. GRAHAM BALFOUR, M.D., F.R.S.,
DEPUTY INSPECTOR-GENERAL OF HOSPITALS, AND HEAD OF THE
STATISTICAL BRANCH.

ERRATA IN REPORT FOR 1862.

Page 14, first Table, second last line, *for* 8·91 *read* 7·45.
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,, 113, first line, *for* IX *read* XI.
,, 130, last line, *for* 30th *read* 80th.
,, 148, China, Colonial Corps, ratio admitted, *insert* 1,449.
,, ,, ,, ,, died, *insert* 23·77.

TO THE DIRECTOR-GENERAL

OF THE

ARMY MEDICAL DEPARTMENT.

SIR,

I HAVE the honour to submit the Statistical Report on the health of the Army for 1863.

The information respecting the troops in the Bengal Presidency is still deficient in some points, but the returns since received are in so satisfactory a state as to warrant the belief that in future the details will be as complete for it as for any of the other foreign stations.

A summary of the leading facts respecting the sickness and mortality of the French army, compiled from official documents just published, and a statement of the mortality in the Russian army during a period of fifteen years, condensed from a paper by Captain Iliashevitch, of the Russian General Staff, will be found at the end of the Report. It is believed the information contained in these papers will be interesting to the officers of the Department.

I have the honour to be,
Sir,
Your most obedient humble servant,

T. GRAHAM BALFOUR,
Deputy Inspector-General.

Whitehall Yard,
July, 1865.

STATISTICAL REPORT FOR 1863.

I.—ON THE HEALTH OF THE TROOPS SERVING IN THE UNITED KINGDOM, IN 1863.

Section I.

Sickness and Mortality.

United Kingdom.

THE average strength of non-commissioned officers and men serving in the United Kingdom during the 52 weeks from 27th December, 1862, to 25th December, 1863, inclusive, as shown by the weekly returns, was 75,945. The admissions into hospital among them during the same period amounted to 72,908, the deaths to 673, and the average constantly sick to 3,732. These numbers give the ratio of 960 admissions, 8·86 deaths, and 49·14 constantly sick, per 1,000 of mean strength. Of the deaths, 556 occurred while the men were present with, and 117 while absent from their corps.

In the following Table these ratios are brought into comparison with the average of the three preceding years.

	Ratio per 1,000 of Mean Strength.		
	Admitted into Hospital.	Died.	Constantly Sick.
1863..	960	8·86	49·14
1860–62	1,025	9·35	54·28

The results for 1863 contrast favourably with those for the average of the three preceding years. If, however, they are compared with those for 1862 alone, while there is a satisfactory decrease in the admissions into hospital and the mean daily sick, a trifling increase will be found in the proportion of deaths, which in that year was 8·72 per 1,000.

United Kingdom.

The admissions and deaths by the different classes of diseases are shown in the following Table.

Orders.	Average Strength, 75,945.	Admitted into Hospital	Died.			Ratio per 1,000 of Mean Strength.			
			With the Regiment.	Absent from the Regiment.	Total.	1863.		1860–2.	
						Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	14,324	60	8	68	188·6	·89	222·8	1·06
2	Enthetic " ..	23,303	6	1	7	306·8	·09	352·3	·12
3	Dietic " ..	632	3	1	4	8·3	·05	6·6	·06
4	Parasitic " ..	3,586	..	..	..	47·2	..	36·0	..
	Class II.								
1	Diathetic Diseases ..	261	7	4	11	3·4	·14	2·4	·14
2	Tubercular " ..	1,285	163	64	227	16·9	2·99	18·6	3·49
	Class III. Diseases of the—								
1	Nervous System ..	1,396	47	8	55	18·4	·73	19·6	·68
2	Circulatory " ..	702	64	4	68	9·2	·89	8·8	·73
3	Respiratory " ..	5,765	74	14	88	75·9	1·17	97·8	1·47
4	Digestive " ..	2,807	37	4	41	37·0	·54	37·9	·48
5	Urinary " ..	206	12	1	13	2·7	·17	2·9	·10
6	Reproductive " ..	971	..	..	..	12·8	..	7·4	..
7	Locomotive " ..	331	2	..	2	4·4	·03	3·5	·02
8	Integumentary " ..	10,449	5	..	5	137·6	·06	121·7	·08
	Class IV.								
4	Diseases of Nutrition..	149	2	..	2	2·0	·03	2·0	·03
	Class V.								
1	Accidents	6,517	50	6	56	85·8	·74	80·2	·59
3	Homicide	..	1	..	1	..	·01	..	·02
4	Suicide..	22	22	1	23	·3	·31	·1	·26
5	Execution	..	1	..	1	..	·01	..	·02
6	Corporal Punishment..	181	..	..	..	2·4	..	2·0	..
	No Appreciable Disease	12	..	..	..	·3	·01	2·3	..
	Not specified	1	..	1	1				
	Malingering	8	..	..	..				
	Total ..	72,908	556	117	673	960·0	8·86	1,024·9	9·35

This Table shows both the admissions and deaths in 1863 to have been under the average of the three preceding years. On comparing the results with those for 1862 it will be seen that the admissions have been 29 per 1,000 below, but the deaths 0·14 per 1,000 above the proportion in that year. It may be noted, however, that there was an increase in the mortality of the general population of England and Wales to the extent of 1·67 per 1,000 upon the results of the preceding year. The reduction in the admissions has been chiefly in miasmatic and venereal diseases, and in those of the respiratory system. In the mortality it has been in miasmatic and tubercular diseases, and in those of the respiratory system.

The following Table shows the admissions into hospital and deaths at the different groups of Stations, arranged as in the Report for 1862.

United Kingdom.

	Average Strength.	Admitted into Hospital.	Died.	Average constantly Sick.
1. Seaport Towns	9,906	9,691	82	525
2. Dockyards and Arsenals	9,952	10,266	76	478
3. Camps	21,562	19,629	128	1,051
4. Large Manufacturing Towns ..	3,298	3,248	35	159
5. London and Windsor	6,087	5,638	45	323
6. Dublin	4,622	4,237	37	262
7. Stations of Depôt Battalions not included in preceding groups ..	12,039	12,339	101	572
8. Remaining Stations	8,479	7,860	51	362
9. Detached from their Corps ..	..	..	117	..
Total ..	75,945	72,908	673	3,732

	Ratio per 1,000 of Strength.					
	1863.			1860–62.		
	Admitted into Hospital.	Died.	Constantly Sick.	Admitted into Hospital.	Died.	Constantly Sick.
1. Seaport Towns	978	8·38	53·00	1,053	8·11	56·79
2. Dockyards and Arsenals ..	1,031	7·62	48·03	1,274	10·68	67·93
3. Camps	910	5·93	48·74	933	6·33	50·56
4. Large Manufacturing Towns	985	10·60	48·21	1,025	8·26	49·30
5. London and Windsor	926	7·36	53·06	851	8·71	52·71
6. Dublin	917	8·00	56·68	988	7·88	56·39
7. Stations of Depôt Battalions not included in preceding groups	1,024	8·38	47·51	1,051	9·28	56·17
8. Remaining Stations ..	927	6·01	42·60	995	6·45	43·00
Total, including men detached from their Corps	960	8·86	49·14	1,025	9·35	54·28

This Table shows a great reduction in the admissions into hospital and deaths in the Dockyards and Arsenals, and a reduction also in the admissions, though not so striking, at all the other groups of Stations, except London and Windsor. There has been a marked excess over the average in the mortality at the large manufacturing towns. The camps furnish the lowest proportion both of sickness and mortality.

During 1863, as in the preceding year, part of the London duties was performed by a regiment of the Line. The relative sickness and mortality per 1,000 of mean strength in it, compared with the Household Cavalry and Foot Guards doing duty in London and Windsor, were as follows:—

	Ratio per 1,000.		
	Admissions.	Deaths.	Mean Sick.
Household Cavalry	642	7·41	33·77
Foot Guards	1,039	8·22	62·55
1st Battalion 3rd Foot	804	1·70	46·00

These results do not differ materially from those of 1862, except as regards the mortality in the Line regiment, but the numbers are so limited that we must naturally expect considerable fluctuations in the proportion of the deaths.

The influence of the different classes of diseases on the sickness and mortality at each group of Stations is shown in the following Table.

United Kingdom.

	Groups of Stations ..	Seaports.		Dockyards and Arsenals.		Camps.		Manufacturing Towns.		London and Windsor.		Dublin.		Depôt Battalions.		Remaining Stations.	
	Average Strength ..	9,906		9,952		21,562		3,298		6,087		4,622		12,039		8,479	
Orders.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted	Died	Admitted.	Died.
	Class I.																
1	Miasmatic Diseases ..	1,828	10	2,085	8	3,722	16	548	..	1,245	10	634	3	2,820	10	1,442	3
2	Enthetic " ..	3,354	1	2,938	1	6,573	2	1,002	1	1,743	..	1,844	..	3,303	1	2,546	..
3	Dietic " ..	122	..	107	..	119	..	24	..	36	..	13	..	132	1	79	2
4	Parasitic " ..	478	..	574	..	930	..	266	..	331	..	70	..	680	..	257	..
	Class II.																
1	Diathetic Diseases ..	18	..	37	..	87	2	4	..	28	1	7	..	53	4	27	..
2	Tubercular " ..	169	25	167	27	334	25	61	18	132	13	89	15	189	29	144	11
	Class III.																
	Diseases of the—																
1	Nervous System ..	161	4	241	6	360	17	50	4	76	2	73	3	309	5	126	6
2	Circulatory " ..	91	9	107	5	193	21	33	..	37	9	53	4	130	8	58	8
3	Respiratory " ..	713	11	965	8	1,376	16	263	7	472	4	315	4	1,040	18	621	6
4	Digestive " ..	369	6	406	9	711	10	135	..	207	2	151	1	528	6	300	3
5	Urinary " ..	28	..	35	2	63	5	6	1	16	1	2	1	38	1	18	1
6	Reproductive " ..	126	..	124	..	332	..	33	..	36	..	67	..	137	..	116	..
7	Locomotive " ..	26	..	59	1	106	1	16	..	24	..	17	..	52	..	31	..
8	Integumentary " ..	1,266	..	1,432	..	2,954	..	462	..	733	..	576	1	1,840	4	1,186	..
	Class IV.																
4	Diseases of Nutrition ..	13	..	41	..	33	2	1	..	12	..	4	..	37	..	8	..
	Class V.																
1	Accidents	898	13	933	4	1,689	5	321	2	491	3	305	5	1,013	11	867	7
3	Homicide	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..
	Suicide	1	4	1	4	6	6	2	1	3	..	..	..	3	3	6	4
	Execution	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
6	Corporal punishment ..	26	..	12	..	40	..	21	..	13	..	16	..	28	..	25	..
	Diseases not specified ..	4	..	2	..	1	..	..	..	3	..	1	..	7	..	3	..
	Total	9,691	83	10,266	76	19,629	128	3,248	35	5,638	45	4,237	37	12,339	101	7,860	51

United Kingdom.

RATIO per 1,000 of MEAN STRENGTH.

Orders.	Groups of Stations ..	Seaports.		Dockyards and Arsenals.		Camps.		Manufacturing Towns.		London and Windsor.		Dublin.		Depôt Battalions.		Remaining Stations.	
	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.																
1	Miasmatic Diseases ..	184·5	1·01	209·5	·80	172·6	·74	166·2	..	204·5	1·64	137·2	·65	234·2	·83	170·1	·35
2	Enthetic " ..	338·6	·10	295·2	·10	304·8	·09	303·8	·30	286·4	..	398·9	..	274·4	·08	300·3	..
3	Dietic " ..	12·3	..	10·8	..	5·5	..	7·3	..	5·9	..	2·8	..	10·9	·08	9·3	·24
4	Parasitic " ..	48·3	..	57·7	..	43·1	..	80·6	..	54·4	..	15·1	..	56·5	..	30·3	..
	Class II.																
1	Diathetic Diseases ..	1·8	..	3·7	..	4·0	·09	1·2	..	4·6	·16	1·5	..	4·4	·33	3·2	..
2	Tubercular " ..	17·1	2·52	16·8	2·71	15·5	1·16	18·5	5·46	21·7	2·13	19·3	3·24	15·7	2·41	17·0	1·30
	Class III. Diseases of the—																
1	Nervous System ..	16·3	·40	24·2	·60	16·7	·79	15·2	1·21	12·5	·32	15·8	·65	25·7	·41	14·8	·71
2	Circulatory " ..	9·2	·91	10·8	·50	8·9	·97	10·0	..	6·1	1·48	11·5	·86	10·8	·67	6·8	·94
3	Respiratory " ..	72·0	1·11	97·0	·80	63·8	·74	79·8	2·12	77·5	·65	68·1	·86	86·4	1·49	73·2	·71
4	Digestive " ..	37·2	·61	40·8	·91	33·0	·46	40·9	..	34·0	·33	32·7	·22	43·9	·51	35·4	·35
5	Urinary " ..	2·8	..	3·5	·20	2·9	·24	1·8	·30	2·6	·16	·4	·22	3·2	·08	2·1	·12
6	Reproductive " ..	12·7	..	12·5	..	15·4	..	10·0	..	5·9	..	14·5	..	11·4	..	13·7	..
7	Locomotive " ..	2·6	..	5·9	·10	4·9	·04	4·8	..	3·9	..	3·7	..	4·3	..	3·7	..
8	Integumentary " ..	127·8	..	143·9	..	137·0	..	140·1	..	120·4	..	124·6	·22	152·8	·33	189·9	..
	Class IV.																
4	Diseases of Nutrition ..	1·3	..	4·1	..	1·5	·09	·3	..	2·0	..	·9	..	3·1	..	·9	..
	Class V.																
1	Accidents	90·7	1·31	93·7	·40	78·3	·24	97·3	·61	80·7	·49	66·0	1·08	84·1	·91	102·3	·82
3	Homicide	..	..	..	..	..	..	..	·30	..	..	..	..	..	..	..	..
4	Suicide	·1	·41	·1	·40	·3	·28	·6	·30	·5	..	..	..	·2	·25	·7	·47
5	Execution	..	..	..	·10	..	..	..	..	..	..	..	..	..	..	..	..
6	Corporal punishment ..	2·6	..	1·2	..	1·9	..	6·4	..	2·1	..	3·5	..	2·3	..	2·9	..
	Diseases not specified ..	·4	..	·2	..	·1	..	..	..	·5	..	·2	..	·6	..	·4	..
	Total	978·3	8·38	1,031·6	7·62	910·3	5·93	984·8	10·60	926·2	7·36	916·7	8·00	1,024·9	8·38	927·0	6·01

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MIASMATIC DISEASES.—There has been a reduction in the prevalence of this class at the Dockyards and Arsenals, London and Windsor, and Dublin, and an increase at the Depôt Battalion stations, while in the other groups the results correspond closely with those of 1862. The following has been the proportion of admissions and deaths by the principal diseases comprised in this group:—

		Annual Ratio per 1,000 of Mean Strength.							
		Seaport Towns.	Dockyards and Arsenals.	Camps.	Manufacturing Towns.	London and Windsor	Dublin.	Depôt Battalion Stations.	Remaining Stations.
Eruptive Fevers ..	Admitted	3·9	2·2	2·8	4·5	11·0	2·8	3·4	3·4
	Died ..	·30	..	·09	..	·66	..	..	..
Paroxysmal Fevers ..	Admitted	9·7	15·0	7·6	4·5	..	2·6	10·0	5·5
	Died ..	..	..	·05	..	..	..	..	..
Continued Fevers ..	Admitted	14·5	22·2	22·4	16·4	28·7	13·6	29·5	19·0
	Died ..	·30	·30	·28	..	·98	·65	·50	·70
Dysentery, Diarrhœa, and Cholera	Admitted	16·2	18·3	12·4	14·3	19·9	10·8	18·6	15·4
	Died ..	·30	·40	·09	..	..	..	·17	·12
Sorethroat and Influenza	Admitted	43·4	59·8	33·7	60·3	62·1	47·4	67·4	42·9
	Died ..	..	..	..	..	..	..	·08	..
Ophthalmia	Admitted	26·7	21·5	23·0	22·1	10·2	10·4	34·0	17·9
	Died ..	..	..	..	..	..	..	..	..
Rheumatism	Admitted	51·0	50·0	55·0	38·7	56·5	41·5	49·9	49·5
	Died ..	..	..	..	..	..	..	·08	·12

Eruptive Fevers were more prevalent than in 1862, at all the groups of stations except the Dockyards and Arsenals, and the large manufacturing towns; but the increase was most marked among the troops in London and Windsor. The excess was chiefly caused by the prevalence of Small Pox, although Scarlatina and Measles also occasioned more admissions than in the preceding year. A considerable number of cases of Small Pox occurred among the men of the Foot Guards in London during the first half of the year; and in the Royal Horse Guards at Windsor the disease broke out almost as an epidemic in the beginning of April, ten cases having been admitted into hospital in one week. In the course of the year one case occurred in the Life Guards; twelve, of which one terminated fatally, in the Royal Horse Guards; twenty, with three deaths, in the Grenadier Guards; eight in the Coldstream Guards; and three in the Scots Fusilier Guards. The cases are all reported to have borne marks of previous vaccination. In the latter part of the year Small Pox was very prevalent among the troops at Colchester, twenty cases, and one death, having occurred at it and its out-stations.

Paroxysmal Fevers, and Dysentery and Diarrhœa have been considerably less prevalent than in 1862 at the Seaport Towns, Dockyards and Arsenals, and at Dublin, but the excess of these diseases was attributable in that year to special circumstances connected with the previous service of the men; and the reduction in the amount of *Ophthalmia* in Dublin may be accounted for in the same manner. The other diseases of this class seem scarcely to require special notice.

ENTHETIC DISEASES.—There has been a reduction in the prevalence of this class at all the stations but London and Windsor—where the ratio of admissions has been the same as in 1862—and Dublin, where there has been an increase to the extent of 27 per 1,000 of the strength. Taking the average of all the stations together, the decrease has amounted to 23 per 1,000, and has

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been most marked in the Manufacturing Towns, Dockyards and Arsenals, and Seaports.

The admissions by Venereal in 1862 and 1863 respectively, at the principal stations, have been as follows :—

	Ratio per 1,000 of Mean Strength.			Ratio per 1,000 of Mean Strength.	
	1863.	1862.		1863.	1862.
Canterbury	435	441	Aldershot	303	349
Dublin	399	372	Cork	294	288
Colchester	396	464	Woolwich	292	371
Devonport and Plymouth ..	351	367	Shorncliffe	248	233
			Isle of Wight.. ..	246	..
Portsmouth	349	407	Fermoy	212	159
Manchester	330	455	London and Windsor: Household Cavalry ..	143	127
Chatham and Sheerness	322	313	London and Windsor: Foot Guards	348	348
Dover	313	337	London and Windsor: Line Regiment ..	250	231
The Curragh	308	304			
Edinburgh	305	278			

This shows the reduction to have been greatest at Manchester, Woolwich, Colchester, Portsmouth, and Aldershot. It also shows a notable increase in the prevalence of these diseases at Fermoy, Dublin, and Edinburgh.

The number constantly sick in hospital with *Venereal* was 1539, or 20·28 per 1,000 of mean strength, being 2 per 1,000 below the average of the preceding year. The admissions from the same cause having been 306·8 per 1,000, we deduce the average duration of the cases to have been 24·10 days, and the resulting inefficiency to have been equal to the loss of the services of every man composing the home force for a period of 7·4 days.

ACCIDENTS AND VIOLENCE.—The deaths by accidents amounted to 0·74, and by suicide to 0·31 per 1,000 of the strength, both being slightly in excess of the average. Among the causes of accidental deaths, drowning still holds a prominent place, 36 out of 56 having resulted from it. In the French Army in 1862 the proportion of suicides among the troops serving in France amounted to 0·61 per 1,000. If this may be considered as the average, suicide would appear to be twice as common in the French as in the British Army. Of the 23 deaths in this group in 1863, 15 were by firearms, 3 by cut-throat, 3 by hanging, 1 by poisoning by opium, and 1 from the effects of a self-inflicted contusion of the head.

In accordance with the principle adopted in previous Reports, we have, in preparing a statement of the sickness, mortality, and invaliding by arms of the service, omitted all regiments which were serving at home during a portion of the year only; and we have also, for reasons formerly detailed, confined our information respecting the Royal Engineers and the Coast Brigade, R.A., to the mortality and invaliding.

The following Table shows the amount of sickness, mortality, and invaliding in the different arms of the service.

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	Average Strength.	Admitted into Hospital.	Died in and out of Hospital.	Discharged as Invalids.	Annual Ratio per 1,000 of Strength.			1859-62. Annual Ratio per 1,000.		1860-2. Ratio per 1,000.
					Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Household Cavalry	1,216	771	10	20	634	8·20	16·44	552	8·20	11·71
Dragoon Guards & Dragoons ..	9,436	8,678	61	233	920	6·46	24·70	967	6·22	33·02
Royal Artillery*..	10,155	9,361	64	*	922	6·28	*	1,084	7·14	*
Royal Engineers..	2,294	..	15	..	..	6·54	..	..	7·90	..
Military Train ..	1,167	1,279	5	36	1,096	4·28	30·85	1,095	6·49	29·50
Foot Guards ..	4,108	3,931	36	126	957	8·75	30·63	802	9·40	29·76
Infantry Regts. ..	24,331	19,643	188	825	807	7·68	33·91	880	7·94	27·40
Cavalry Depôts ..	961	1,125	5	14	1,171	5·20	14·56	1,295	10·67	56·95
Depôt Brigade, Royal Artillery*	3,593	3,560	31	305	991	8·63	22·19	1,317	12·24	25·29
Coast Brigade Royal Artillery*	1,389	..	25	9	..	18·00	6·48	..	19·69†	9·48†
Depôt Battalions.	15,852	15,500	175	577	978	11·03	36·40	1,030	12·85	49·72

There has been an increase in the admissions into hospital in the Household Cavalry and Foot Guards, and a decrease in all the other arms, except the Military Train. The mortality in the Cavalry of the Line has been slightly in excess of the average. In the Household Cavalry it has been exactly the average; and in the other arms there has been a reduction, which has been most marked in the Depôts. The invaliding has been above the average in the Household Cavalry and Infantry regiments, but below it in the Cavalry of the Line and in the Depôts.

The high rate of mortality in the Coast Brigade is probably due to the advanced age and previous service of the men composing it, nearly five-sixths of them being above 30 years of age, and having ten or more years' service. In the Depôt Brigade of Artillery, and the Depôt Battalions, it seems also to depend on the deteriorated constitutions of the men from previous service.

On estimating, on the principles explained in a previous Report, the mortality which would have occurred in each arm of the service had the numbers serving at each quinquennial period of life been the same as in the Dragoon Guards and Dragoons in 1863, the following results are obtained. The ratio for the previous periods, and for the civil male population, which is annexed for the purpose of comparison, has been calculated on the same principle.

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* The greater number of the invalids from the Royal Artillery are discharged at Woolwich, and appear in the return of the Depôt Brigade. The ratio per 1,000 is therefore calculated upon 13,748, the average strength of the corps serving at home, exclusive of the Coast Brigade.

† The ratio for 1862 only.

Ratio of Deaths per 1,000 living in	1863.	1859-62	1860–62. *United Kingdom.*
Household Cavalry	6·90	6·28	..
Dragoon Guards and Dragoons	6·46	6·56	..
Royal Artillery	5·59	7·49	..
Military Train	5·25	8·03	..
Foot Guards	9·61	9·10	..
Infantry Regiments	7·41	8·19	..
Cavalry Depôts	3·63	..	9·29
Depôt Brigade Royal Artillery	10·79	..	16·14
Coast Brigade „ „	4·64	..	9·26
Depôt Battalions	9·53	..	12·96
Civil Male Population of healthy districts in England and Wales	7·53		
Ditto ditto of England and Wales generally ..	8·97		

It will be seen from the Table that the rate of mortality has been lower than that of the male population of the healthy districts of England in all the arms except the Foot Guards, the Depôt Brigade, R.A., and the Depôt Battalions. The numbers in the Cavalry Depôts and Coast Brigade are not sufficient to afford satisfactory results. In comparing the mortality of the different arms with each other, it must not be forgotten that the results in the Royal Artillery and the Infantry regiments may be affected by the recruits being attached at first to the Depôts, and a number of old soldiers also being sent to them, while the Cavalry Corps serving at home and the Foot Guards have no Depôts. In the case of the Artillery, the influence of this cannot be correctly estimated; but in the Infanty regiments, on adding the average strength and deaths of the Depôts to those of their respective corps, and calculating the rate of mortality on the same principle as in the preceding Table, it is raised from 7·41 to 7·98 per 1,000.

In the preceding Tables the ratio of mortality has been calculated from the deaths occurring in the effective force; but those among men discharged during the year, many of them in an advanced stage of disease, must be added to give an accurate idea of the relative mortality of the different arms. This can only be done in the case of men placed on the pension list, as there are no means of tracing those who, on discharge, were considered to have no claim to a pension. The number who were placed on the pension-list during 1863, and of those who died between the date of their discharge and the 31st December, are stated in the following Table.

	Placed on the Pension List during the Year 1863.	Of whom there Died before 31st December, 1863.
Household Cavalry	55	1
Dragoon Guards and Dragoons ..	298	8
Royal Artillery	288	10
Military Train	31	..
Foot Guards	180	7
Infantry Regiments and their Depots	1,400	36

On adding to the strength half the number placed on the pension, on the principles explained in a former Report, and the deaths to the mortality already recorded, the following results are obtained:—

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	1863.			1860-62.
	Average Strength corrected as above.	Deaths of Soldiers and Pensioners.	Ratio of Deaths per 1,000 of Strength.	Ratio of Deaths of Soldiers and Pensioners per 1,000 of Strength.
Household Cavalry	1,244	11	8·84	9·67
Cavalry of the Line	9,585	69	7·20	6·86
Royal Artillery	10,299	74	7·18	7·10
Military Train	1,198	5	4·17	6·92
Foot Guards	4,288	43	10·03	12·09
Infantry Regiments and their Depôts	27,909	262	9·17	9·24

The mortality in the Foot Guards shows a considerable reduction upon the average of the three preceding years, but it still continues higher than in any of the other arms. In the Cavalry of the Line it has been in excess of the average, but is still below that of the civil population of the healthy districts.

The number of admissions into hospital, deaths, and discharges by invaliding, in each arm of the service, and the proportion of these to the strength, are shown in the following Tables. The details for 1863 will be found in Abstract No. I. of Appendix.

Orders.		Household Cavalry.			Dragoon Guards and Dragoons.			Royal Artillery.			Military Train.			Foot Guards.			Infantry Regiments.			Cavalry Depôts.			Depôt Brig. Royal Artillery.		Infantry Depôt Battalions.			Royal Engineers.	Coast Brigade, R. A.	
	Strength	1,216			9,486			10,155			1,167			4,108			24,331			961			3,593		15,852			2,294	1,889	
		Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Admitted.	Died.	Invalided.	Died.	Died.	Invalided.
	Class I.																													
1	Miasmatic Diseases ..	192	3	..	1,536	6	23	1,619	4	17	211	..	3	838	6	12	3,748	15	124	266	1	6	720	5	3,557	14	76	4	2	..
2	Enthetic " ..	170	..	..	2,771	1	15	3,133	1	20	474	..	4	1,315	..	7	6,739	4	48	341	..	..	1,205	..	3,918	1	22	..	..	..
3	Dietic " ..	6	..	..	35	..	..	111	1	..	6	..	..	31	..	..	116	..	2	3	..	..	17	..	175	1	1	..	..	..
4	Parasitic " ..	18	..	..	413	..	..	376	..	..	60	..	..	238	..	..	873	..	..	132	..	..	171	..	971	..	..	..	..	..
	Class II.																													
1	Diathetic Diseases ..	8	..	..	30	1	5	38	..	3	4	..	..	19	1	..	60	2	5	6	1	..	10	..	56	6	4	..	1	..
2	Tubercular " ..	10	2	16	131	19	62	148	18	99	22	2	6	93	13	58	871	62	197	5	..	1	72	11	237	55	106	5	10	4
	Class III. Diseases of the—																													
1	Nervous System ..	19	..	..	144	7	35	117	5	39	25	..	5	51	1	9	355	17	74	16	..	3	66	1	418	19	112	1	3	2
2	Circulatory " ..	7	2	2	50	8	24	67	5	30	12	2	2	24	7	11	213	22	111	7	..	1	81	3	208	16	86	..	..	1
3	Respiratory " ..	52	1	..	468	9	8	675	6	16	106	..	4	377	2	14	1,533	27	83	60	..	1	291	5	1,411	24	47	3	4	..
4	Digestive " ..	58	1	..	250	2	15	331	5	25	43	..	8	112	2	3	828	12	57	46	2	1	109	2	668	12	53	1	1	..
5	Urinary " ..	8	1	..	13	1	1	24	1	8	4	..	1	11	..	1	46	4	7	2	..	..	9	1	71	6	8	..	..	..
6	Reproductive " ..	5	..	..	147	..	5	119	..	3	29	..	..	18	..	1	270	..	11	11	..	..	56	..	154	..	4	..	..	..
7	Locomotive " ..	..	..	1	42	1	9	50	..	13	2	..	..	24	..	5	78	..	26	1	..	1	12	1	95	..	23	..	..	..
8	Integumentary " ..	130	..	..	1,605	..	12	1,422	..	18	146	..	1	431	..	6	2,657	..	25	134	..	..	498	..	2,306	4	15	..	..	..
	Class IV.																													
4	Diseases of Nutrition.	..	..	..	3	..	3	25	..	4	1	..	..	4	..	..	82	1	18	..	..	..	9	..	68	2	8	..	..	..
	Class V.																													
1	Accidents	97	..	1	1,026	8	16	1,085	14	15	124	1	2	335	4	4	1,661	16	37	95	..	..	277	..	1,152	8	12	..	3	1
3	Homicide	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..
4	Suicide	..	..	..	1	3	..	..	3	..	1	..	..	2	..	..	3	3	..	..	1	..	..	2	3	7	..	1	1	1
5	Execution	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	Corporal Punishment.	..	..	..	14	..	..	26	..	..	6	..	..	7	..	..	54	..	..	..	..	..	7	..	38	..	..	..	..	..
	No appreciable disease	1	..	..	4	..	..	..	..	..	1	..	..	1	..	..	4	1	..	..	..	..	..	..	3	..	..	..	..	..
	Malingering	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..
	Total	771	10	20	3.678	61	233	9.861	64	305	1,279	5	36	3.931	36	126	19.643	1·8	825	1,125	5	14	3.560	31	15,500	175	577	15	25	9

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Ratio per 1,000 of Mean Strength.

Orders.		Household Cavalry.			Dragoon Guards and Dragoons.			Royal Artillery.			Military Train.			Foot Guards.			Infantry Regiments.			Cavalry Depôts.			Depôt Brig. Royal Artillery.		Infantry Depôt Battalions.			Royal Engineers.	Coast Brigade, R.A.	
	Strength..	1,216			9,436			10,155			1,167			4,108			24,331			961			3,593		15,852			2,294	1,389	
		Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Admitted.	Died.	Invalided.	Died.	Died.	Invalided.
	Class I.																													
1	Miasmatic Diseases ..	158·0	2·46	..	162·7	·64	2·52	159·5	·38	1·24	180·9	..	2·57	204·0	1·46	2·91	154·1	·61	5·10	276·7	1·04	6·24	200·4	1·40	224·3	·88	4·81	1·75	1·44	..
2	Enthetic " ..	139·8	..	..	298·7	·105	1·58	308·5	·10	1·45	406·2	..	3·43	320·1	..	1·71	277·0	·16	1·97	354·9	..	..	335·4	..	247·2	·06	1·39	.	..	..
3	Dietic " ..	4·9	..	..	3·7	..	..	10·9	·10	..	5·1	..	..	7·6	..	..	4·8	..	·08	3·1	..	..	4·7	..	11·0	·06	·06	..	..	..
4	Parasitic " ..	14·8	..	..	43·8	..	..	37·0	..	..	51·4	..	..	57·9	..	..	35·8	..	..	137·4	..	..	47·6	..	61·3	..	..	..	..	..
	Class II.																													
1	Diathetic Diseases ..	6·6	..	..	3·2	·105	·52	3·7	..	·22	3·4	..	..	4·6	·24	..	2·5	·08	·21	6·2	1·04	..	2·8	..	3·5	·38	·25	..	·72	..
2	Tubercular " ..	8·2	1·64	18·16	13·9	2·01	6·57	14·1	1·77	7·20	18·8	1·71	5·14	22·6	3·18	12·90	15·2	2·55	8·10	5·2	..	1·04	20·0	3·06	15·0	3·47	6·69	2·17	7·20	2·88
	Class III. **Diseases of the—**																													
1	Nervous System ..	15·6	..	..	15·3	·74	3·70	11·5	·49	2·84	21·4	..	4·28	12·4	·24	2·19	14·6	·70	3·04	16·6	..	3·12	18·4	·28	26·4	1·20	7·07	·44	2·16	1·44
2	Circulatory " ..	5·8	1·64	1·64	5·3	·85	2·54	6·6	·49	2·18	10·3	1·71	1·71	5·8	1·71	2·68	8·7	·90	4·56	7·3	..	1·04	8·6	·83	12·8	1·01	5·42	..	..	·72
3	Respiratory " ..	42·8	·82	..	49·1	·95	·84	66·5	·59	1·16	90·8	..	3·43	91·8	·48	3·41	63·0	1·10	3·41	62·4	..	1·04	81·0	1·40	89·0	1·51	2·96	1·30	2·88	..
4	Digestive " ..	43·6	·82	..	26·5	·21	1·58	32·6	·49	1·82	36·8	..	6·86	27·3	·48	·73	34·0	·49	2·34	47·9	2·08	1·04	30·4	·55	42·1	·76	3·34	·44	·72	..
5	Urinary " ..	2·4	·82	..	1·4	·105	·10	2·4	·10	·58	3·4	..	·86	2·7	..	·24	1·9	·16	·29	2·1	..	..	2·5	·28	4·5	·38	·50	..	..	..
6	Reproductive " ..	4·1	..	..	15·6	..	·52	11·7	..	·22	24·8	..	..	4·4	..	·24	11·1	..	·45	11·5	..	..	15·6	..	9·7	..	·25	..	..	..
7	Locomotive " ..	..	..	·82	4·4	·105	·95	4·9	..	·95	1·7	..	..	5·8	..	1·22	3·2	..	1·07	1·0	..	1·04	3·3	·28	6·0	..	1·45	..	..	
8	Integumentary " ..	106·9	..	..	170·1	..	1·27	140·0	..	·95	125·1	..	·86	104·9	..	1·46	109·2	..	1·03	139·4	..	..	138·6	..	145·5	·25	·95	..	..	..
	Class IV.																													
4	Diseases of Nutrition ..	..	..	..	·8	..	·32	2·5	..	·29	·9	..	..	1·0	..	..	1·3	·04	·74	..	·4	..	2·5	..	4·0	·13	·50	..	..	..
	Class V.																													
1	Accidents	79·7	..	·82	106·7	·32	1·69	106·8	1·38	1·09	106·3	·86	1·71	81·6	·96	·96	68·3	·65	1·52	98·9	..	..	77·1	..	72·7	·50	·76	..	2·16	·72
3	Homicide	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	·04	·08	..	..	..	..	..	..	..	..	..	..	..	..
4	Suicide	..	..	..	·1	·32	..	..	·29	..	·9	..	..	·5	..	..	·12	·12	..	..	1·04	..	..	·55	·2	·44	..	·44	·72	·72
5	Execution	..	..	..	..	..	..	..	·10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6	Corporal Punishment ..	..	..	..	1·5	..	..	2·6	..	..	5·1	..	..	1·7	..	..	2·2	..	..	..	..	..	1·9	..	2·4	..	..	..	..	..
	No appreciable disease..	·8	..	..	·4	..	..	..	..	..	·9	..	..	·2	..	..	·2	·04	..	..	..	..	..	..	·16	..	..	..	..	..
	Malingering	..	..	..	..	..	..	..	..	..	1·7	..	..	..	..	..	·04	..	..	..	..	..	..	..	·06	..	..	..	..	..
	Total	634·0	8·20	16·44	919·7	6·46	24·70	921·8	6·28	22·19	1095·9	4·28	30·85	956·9	8·75	30·63	807·3	7·68	33·91	1170·6	5·20	14·56	990·8	8·63	977·8	11·08	36·40	6·54	18·00	6·48

United Kingdom

Miasmatic Diseases have been more prevalent than in 1862 in the Household Cavalry and Depôt Battalions, and also to a very trifling extent in the Foot Guards and Infantry Regiments, but the admissions have been less numerous in all the other arms, the decrease being most marked in the Depôt Brigade Royal Artillery, the Military Train, and the Cavalry of the Line. The relative prevalence of the principal groups constituting this class is shown in the following Table.

		Annual Ratio per 1,000 of Mean Strength.								
		Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade, Royal Artillery.	Depôt Battalions.
Eruptive Fevers ..	Admitted..	13·16	2·86	1·97	·86	11·20	1·89	1·04	1·39	7·07
	Died ..	·82	·10	..	..	·73	·08	..	..	·06
Paroxysmal Fevers ..	Admitted..	..	2·86	7·98	6·86	..	7·85	3·12	15·59	9·46
	Died ..	..	..	..	..	..	·04	..	..	..
Continued Fevers ..	Admitted..	10·69	16·96	16·41	15·42	40·17	17·34	27·06	20·32	27·57
	Died ..	1·64	·42	·19	..	·73	·29	1·04	·84	·19
Dysentery, Diarrhœa, and Cholera ..	Admitted..	12·34	14·73	15·95	16·28	23·36	11·01	20·81	12·80	16·34
	Died ..	..	..	·19	..	..	·04	..	·28	·38
Sorethroat and Influenza	Admitted..	57·57	46·21	36·03	32·56	52·58	34·29	80·12	80·15	62·64
	Died ..	..	..	..	..	..	..	..	..	·06
Ophthalmia	Admitted..	5·76	10·39	13·00	26·56	9·01	23·96	30·18	9·74	34·44
	Died ..	..	..	..	..	..	..	..	..	..
Rheumatism	Admitted..	45·23	50·66	46·58	66·84	53·80	45·66	71·80	35·07	49·40
	Died ..	..	·10	..	..	..	..	..	..	·06

United Kingdom.

Eruptive Fevers have been very much more prevalent than in the preceding year in the Household Cavalry, Dragoon Guards and Dragoons, Foot Guards, and Depôt Battalions. In the first the excess arose from the outbreak of Small Pox in the Royal Horse Guards at Windsor; in the Foot Guards it was caused by the same disease in the Grenadier and Coldstream Guards; and in the Depôt Battalions, by the prevalence of Small Pox, Scarlet Fever, and Measles, in the 4th, 9th, and 10th Battalions, at Colchester, and of Scarlet Fever, in the 3rd, at Chatham.

Continued Fevers gave rise to a large proportion of admissions in the Foot Guards, chiefly the 2nd and 3rd Battalions of the Grenadier Guards. The Medical Officers assign no reason for their prevalence, but merely observe that the cases were mostly of a mild nature. The 59th Regiment had a large number of admissions under this head. The Surgeon attributes this to the susceptibility to fever which the men acquired during their service in China, but the disease had lost its character of periodicity, and assumed the form of slight attacks of continued fever.

Dysentery, Diarrhœa, and Cholera.—There has been a decrease in these diseases in all the arms except the Royal Artillery, which remains unchanged, and the Infantry regiments, which show a slight increase upon the results of 1862, but even with this increase the Infantry have had the smallest proportion of admissions.

Sorethroat (Tonsillitis) *and Influenza* have been less prevalent than in the preceding year, in all the arms except the Household Cavalry and Depôt Battalions; but if the admissions by acute bronchitis be added, an increase will be found to have occurred in the latter alone.

Ratio of Admissions per 1,000 of Mean Strength by *Tonsillitis, Influenza,* and *Acute Bronchitis.*

	Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade Royal Artillery.	Infantry Depôts.
1863	93	80	84	101	120	78	103	134	124
1862	114	100	97	123	129	96	116	218	104

ENTHETIC DISEASES.—Venereal disease has been slightly more prevalent in the Military Train and the Foot Guards, but in all the other arms the admissions have continued to diminish.

TUBERCULAR DISEASES.—Compared with the average of the three preceding years (1860–62), the admissions into hospital show a slight increase in the Household Cavalry and Cavalry of the Line only, but in all the arms there has been a reduction in the mortality. Nor has this been the result of discharging a greater number of men affected with these diseases, for the proportion invalided on account of them in 1863 has exceeded the average only in the Household Cavalry, the Royal Artillery, and the Infantry Regiments. The following Table shows the loss in each arm by death and invaliding in 1863 and the three preceding years respectively.

United Kingdom.

Ratio of decrease per 1,000 of Mean Strength by Deaths and Invaliding from Tubercular Diseases.

	1863.			Average of 1860–62.		
	By Deaths.	By Invaliding.	By Deaths and Invaliding.	By Deaths.	By Invaliding.	By Deaths and Invaliding.
Household Cavalry ..	1·64	13·16	14·80	3·55	3·55	7·10
Cavalry of the Line ..	2·01	6·57	8·58	2·34	6·85	9·19
Royal Artillery	1·77	7·20*	8·97	2·65	*6·44	9·09
Military Train	1·71	5·14	6·85	2·55	7·43	9·98
Foot Guards	3·18	12·90	16·08	4·33	13·56	17·89
Infantry Regiments ..	2·55	8·10	10·65	2·69	5·22	7·91
Cavalry Depôts	..	1·04	1·04	3·54	5·15	8·69
Depôt Brigade, R.A. ..	3·06	7·20*	10·26	6·94	*6·44	13·38
Depôt Battalions ..	3·47	6·69	10·16	5·14	9·15	14·29

It will be seen from this Table that the combined loss by death and invaliding from tubercular diseases has been under the average of the three preceding years in all the arms of the service except the Household Cavalry and the Infantry regiments. In the former the proportion is double the previous average, but their numbers are too small to insure regularity in the results: in the latter the average has been exceeded by 2¾ per 1,000.

DISEASES OF THE NERVOUS SYSTEM have been more numerous than in 1862 in the Household Cavalry and Military Train, but have undergone a great reduction in the Depôt Brigade Royal Artillery, and also, though in a less marked degree, in the Royal Artillery.

Combining the cases returned under the head of Intemperance (*Ebriositas*) with those of *Delirium Tremens*, we find that the improvement in the Royal Artillery has not extended to these two diseases, and that the only arms which show a marked reduction are the Cavalry Depôts and Depôt Brigade Royal Artillery. The following Table gives the relative proportion of cases in the two years.

Ratio per 1,000 of Mean Strength.

Admissions by *Ebriositas* and *Delirium Tremens.*	Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade Royal Artillery.	Depôt Battalions.
1863	11·51	4·03	11·52	5·14	7·79	5·67	4·16	4·73	11·67
1862	6·55	5·67	9·82	5·65	6·02	4·85	13·17	10·20	9·69

VIOLENT DEATHS.—Among the casualties under this class are included two men of the 2nd Battalion Grenadier Guards, who were killed by an accident on the Brighton Railway, while they were proceeding on duty from Eastbourne to London.

The deaths by suicide were distributed as follows:—3 in the Cavalry, 3 in

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* In consequence of the impossibility of separating the invalids of the Depôt Brigade from those of the other brigades serving at home, we have been obliged to assume that the proportion discharged as invalids has been the same in each. The ratio has been calculated, as already stated, on the aggregate strength of the Artillery serving in the United Kingdom, exclusive of the Coast Brigade.

United Kingdom.

the Royal Artillery, 1 in the Royal Engineers, 3 in the Infantry regiments, 1 in the Cavalry Depôts, 2 in the Depôt Brigade and 1 in the Coast Brigade Royal Artillery, and 7 in the Depôt Battalions.

CORPORAL PUNISHMENT has ranged between 5·1 in the Military Train and 1·5 in the Cavalry.

The following Table shows the admissions, deaths, and discharges by invaliding in each of the corps comprised in these returns :—

Regiments, &c.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.	months.
1st Life Gds.	409	182	1	2	3	3	445·0	7·33	7·33	Windsor 3 Regent's Pk. 9
2nd Life Gds.	407	303	1	..	1	16	744·5	2·46	39·31	Regent's Pk. 3 Hyde Park 9
R. Horse Gds.	400	286	6	..	6	1	715·0	15·00	2·50	Hyde Park 3 Windsor 9
	1,216	771	8	2	10	20	634·0	8·20	16·44	
4th Dr. Gds.	583	474	2	1	3	26	813·0	5·15	4·46	Dublin 5½ Curragh 3 Dundalk, &c. 3½
5th "	586	467	1	1	2	13	796·9	3·41	22·18	Dublin 6 Curragh 1½ Cahir, &c. 4½
6th "	586	636	3	2	5	20	1085·4	8·53	34·13	Aldershot 12
1st Dragoons	587	548	4	..	4	20	933·6	6·81	34·07	Birming., &c. 4 Aldershot 8
2nd "	584	619	1	2	3	7	1060·0	5·14	11·99	Edinburgh 4 Birmingham 8
3rd Hussars	597	570	5	..	5	22	952·8	8·38	36·85	Dublin 4 Edinburgh 8
4th "	590	353	1	..	1	24	598·3	1·69	40·68	Newbridge 9 Dublin 3
9th Lancers	593	319	1	..	1	12	537·9	1·69	20·23	Brighton 12
10th Hussars	592	569	5	2	7	7	961·2	11·82	11·82	York 4 Dublin 2 Newbridge 5 Dublin 1
11th "	593	398	2	1	3	7	671·2	5·06	11·81	Cahir, &c. 6 Dublin 1½ Curragh 1 Dublin 3½
12th Lancers	577	525	4	..	4	4	909·9	6·93	6·93	Aldershot 7 Hounslow, &c. 5
13th Hussars	600	658	2	2	4	28	1096·7	6·68	46·67	Aldershot 12
14th "	595	546	3	..	3	17	917·7	5·04	28·57	Manchester 12
15th "	593	735	3	1	4	4	1239·5	6·75	6·75	Dundalk 6½ Dublin 2 Curragh & Newbridge 3½
16th Lancers	584	592	5	2	7	13	1013·7	11·99	22·26	Sheffield, &c. 3½ York, &c. 8½
18th Hussars	596	669	4	1	5	9	1122·5	8·39	15·10	Hounslow, &c. 6 Aldershot 1½ Norwich, &c. 4½
	9,436	8,678	46	15	61	233	919·67	6·44	24·70	

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Regiments, &c.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.	months.
Rl. Artillery: 1st Horse Brig.	1,927	1,751	6	2	8	..	908·7	4·15	..	Woolwich Aldershot Dublin } 12
Riding Establishment	211	253	2	..	2	..	1199·1	9·48	..	Woolwich 12
2nd Brigade	898	711	3	2	5	..	791·8	5·57	..	Channel Isles 2½ Dover 9½
4th „	800	635	5	3	8	..	793·8	10·00	..	Aldershot Portsmth. } 12
5th „	920	817	4	5	9	..	888·0	9·78	..	Devonport &c. Pembroke Dock } 12
6th „	1,071	997	1	2	3	..	928·8	2·80	..	Portsmouth 2 Chan. Isles 10
7th „	669	580	2	5	7	..	867·0	10·46	..	Woolwich 2½ Gosport, &c. 9½
8th „	1,313	1,268	6	2	8	..	965·7	6·09	..	Dublin, &c. 12
9th „	1,466	1,438	4	3	7	..	980·9	4·77	..	S. E. Dist. Leith Fort } 12
13th „	880	911	7	..	7	..	1035·2	7·95	..	Woolwich 12
	10,155	9,361	40	24	64	..	921·8	6·28	..	
Military Train 1st Battalion	292	292	..	..	..	12	1000·0	..	41·10	Woolwich 12
2nd „	288	274	1	1	2	4	951·4	6·94	13·89	Aldershot 12
5th „	289	365	1	..	1	8	1263·9	3·46	27·68	Woolwich 5 Aldershot 7
6th „	298	348	2	..	2	12	1167·8	6·71	40·27	Curragh, &c. 12
	1,167	1,279	4	1	5	36	1096·0	4·28	30·85	
Gren. Gds., 2nd Bat. ..	883	830	7	3	10	19	940·0	11·33	21·52	London 7 Aldershot 1 London 4
3rd Bat. ..	870	885	6	2	8	25	1017·2	9·20	28·54	London 9 Windsor 3
Coldm. Gds., 1st Bat. ..	748	739	4	1	5	19	988·0	6·69	25·40	Windsor 3 London 9
2nd Bat. ..	732	721	1	3	4	20	985·0	5·46	27·32	London 3 Windsor 6 London 3
Scots F. Gds., 1st Bat. ..	875	756	6	3	9	43	864·0	10·29	49·15	London 5 Aldershot 2 London 5
	4,108	3,931	24	12	36	126	956·91	8·75	30·63	
1st Foot, 2nd Bat.	824	502	5	1	6	27	609·2	7·28	32·77	Aldershot 7 Portsmouth 5
2nd Foot, 1st Bat.	773	730	9	2	11	19	944·4	14·23	24·58	Aldershot 3½ Devonport 8½
3rd Foot, 1st Bat.	794	628	4	2	6	24	790·9	7·56	30·23	Aldershot 12
5th Foot, 1st Bat.	799	439	4	..	4	22	549·4	5·01	27·54	Aldershot 5 Shorncliffe

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Regiments, &c.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Annual Ratio per 1,000.			Stations.	months.
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.		
6th Foot, 1st Bat.	772	816	9	1	10	21	1057·0	12·95	27·20	Gosport Aldershot	4½ 7½
8th Foot, 1st Bat.	804	501	7	2	9	26	623·1	11·19	32·34	Sheffield	12
10th Foot, 1st Bat.	783	448	4	4	8	27	572·2	10·22	34·48	Dublin Curragh Kilkenny	4½ 4½ 3
11th Foot, 1st Bat.	805	750	2	..	2	58	931·7	2·48	72·05	Cork, &c. Curragh Dublin	4½ 2 5½
12th Foot, 2nd Bat.	785	586	2	2	4	21	746·5	5·10	26·75	Curragh Dublin	9 3
24th Foot, 1st Bat.	778	811	13	1	14	51	1042·5	18·84	65·55	Aldershot	12
26th Foot ..	843	441	1	..	1	29	523·1	1·19	34·42	Aldershot Portsmouth	5 7
29th ,, ..	746	502	8	2	10	23	672·9	13·41	30·83	Glasgow, &c. Curragh Dublin	4 6 2
32nd ,, ..	759	637	4	2	6	30	839·3	7·91	39·52	Devonport Curragh Dublin	3 6 3
37th ,, ..	790	606	9	..	9	14	767·1	11·39	17·72	Aldershot	12
41st ,, ..	774	738	7	4	11	14	953·5	14·21	18·09	Newcastle, &c. Glasgow, &c.	4 8
45th ,, ..	771	500	3	1	4	44	648·5	5·19	57·07	Dublin Curragh	3 9
49th ,, ..	800	606	5	..	5	19	757·5	6·25	23·75	Manchester &c.	12
53rd ,, ..	778	656	6	..	6	20	824·0	7·71	25·71	Portsmth., &c.	12
58th ,, ..	786	592	7	1	8	35	770·7	10·18	44·53	Dublin Newry, &c.	9 3
59th ,, ..	802	804	2	..	2	8	1002·5	2·49	99·75	Dover Aldershot	5 7
60th Foot 1st Bat.	801	590	1	..	1	29	736·6	1·25	36·21	Tower	12
60th Foot, 2nd Bat.	781	714	2	..	2	40	914·2	2·56	51·22	Portsmouth Aldershot	5 7
61st Foot ..	796	759	1	4	5	15	953·5	6·28	18·84	Aldershot Chan. Isles	1½ 10½
64th ,, ..	814	563	2	2	4	29	691·7	4·91	35·63	Aldershot Gosport, &c.	10½ 1½
73rd ,, ..	759	384	3	..	3	16	505·9	3·95	35·66	Devonport Aldershot	4 8
75th ,, ..	730	1,204	3	1	4	30	1649·3	5·48	41·10	Devonport Aldershot	11 1
78th ,, ..	787	654	3	3	6	34	831·0	7·62	43·20	Shorncliffe Dover	5 7
83rd ,, ..	761	618	8	..	8	11	812·1	10·51	14·45	Dover Shorncliffe	4 8
84th ,, ..	767	733	7	..	7	35	955·7	9·13	45·63	Shorncliffe Curragh	6½ 5½
86th ,, ..	780	563	3	1	4	41	721·8	5·13	52·56	Waterford Curragh Dublin	4 4 4
87th ,, ..	789	568	7	1	8	13	719·9	10·14	16·47	Curragh Aldershot	3 9
	24,331	19,643	151	37	188	825	807·3	7·68	33·90		

United Kingdom.

Regiments, Depôt Battalions, &c.	Strength.	Admitted into Hospital.	Died.		Total Deaths.	Discharged as Invalids.	Annual Ratio per 1,000.			Stations.
			In Hospital.	Out of Hospital.			Admitted.	Died.	Invalided.	
Cavalry Deps:										
Canterbury	630	780	1	..	1	11	1238·1	1·59	17·46	
Maidstone.	331	345	3	1	4	3	1042·3	12·11	9·06	
	961	1,125	4	1	5	14	1170·7	5·20	14·56	
R.A. Dep. Bde.										months.
Depôt R.H.A.	390	532	1	..	1	..	1364·1	2·56	..	Woolwich 3½ Canterbury 8½
1st Divisn. Dep. Bde.	721	552	3	..	3	..	765·6	4·16	..	Sheerness 12
2nd " "	1,017	1,122	3	1	4	..	1103·3	3·93	..	Woolwich 12
3rd " "	697	839	3	..	3	..	1203·7	4·31	..	Warley 12
4th " "	768	515	15	5	20	..	718·5	27·90	..	Woolwich 12
	3,593	3,560	25	6	31	..	990·8	8·63	..	
1st Dep. Bat.	878	789	8	3	11	26	898·6	12·53	29·61	Chatham
2nd " ..	969	895	12	1	13	33	923·6	13·41	34·06	Chatham
3rd " ..	649	1,229	4	..	4	35	1893·7	6·16	53·93	Chatham
4th " ..	759	969	4	3	7	20	1276·7	9·22	26·35	Colchester
5th " ..	761	623	7	..	7	58	818·7	9·20	76·22	Parkhurst
6th " ..	610	564	4	1	5	17	924·6	8·20	27·87	Walmer
7th " ..	627	892	5	1	6	46	1422·6	9·57	75·08	Winchester
8th " ..	655	669	5	4	9	18	1021·4	13·74	27·48	Pembroke Dock
9th " ..	847	695	9	2	11	23	820·6	12·99	27·16	Colchester
10th " ..	732	735	9	..	9	22	1004·1	12·30	30·06	Colchester
11th " ..	773	925	8	2	10	18	1196·6	12·93	23·29	Preston
12th " ..	811	553	8	3	11	35	681·9	13·60	43·16	Athlone
13th " ..	628	502	7	..	7	34	799·4	11·15	54·15	Birr
14th " ..	650	684	4	..	4	31	1052·3	6·15	47·69	Belfast
15th " ..	556	550	5	1	6	18	989·2	10·79	32·37	Buttevant
16th " ..	745	497	10	1	11	29	667·1	14·77	38·93	Templemore
17th " ..	756	699	6	2	8	14	924·6	10·58	18·52	Limerick
18th " ..	789	492	3	5	8	25	623·6	10·14	31·69	Fermoy
19th " ..	832	820	5	..	5	12	895·6	5·97	14·32	Fermoy
20th " ..	773	620	10	2	12	32	802·1	15·52	41·40	Cork
22nd " ..	503	533	3	6	9	13	1057·2	17·89	25·85	Stirling
23rd " ..	549	565	2	..	2	18	1029·2	3·64	32·79	Aberdeen
	15,852	15,500	138	37	175	577	977·8	11·03	36·40	

In the Household Cavalry, the 2nd Life Guards has furnished the largest proportion of admissions into hospital and invaliding, but the mortality has been highest in the Royal Horse Guards. In the Dragoon Guards and Dragoons, the admissions have been highest in the 15th Hussars, at Dundalk, Dublin, and the Curragh; the 18th Hussars, at Hounslow, Aldershot, and Norwich; the 13th Hussars and 6th Dragoon Guards, at Aldershot; the 2nd Dragoons, at Edinburgh and Birmingham; and the 16th Lancers, at Sheffield and York. The corps in which they have been lowest have been the 9th Lancers, at Brighton; the 4th Hussars, at Newbridge and Dublin; the 11th Hussars, at Cahir, Dublin, and the Curragh, and the 5th Dragoon Guards at the same stations.

The 3rd Battalion Grenadier Guards has had the greatest proportion of admissions, and the 1st of the Scots Fusilier Guards the least in the Brigade of Guards.

The admissions in the 75th Regiment at Devonport and Aldershot were

United Kingdom.

excessively high, amounting to no less than 1,649 per 1,000. In the 1st Battalion of the 6th at Gosport and Aldershot, and of the 24th at Aldershot, and in the 59th Regiment at Dover and Aldershot, the ratio was considerably above the average. The corps which gave the smallest proportion of admissions were the 73rd, at Devonport and Aldershot; the 26th, and 2nd Battalion 1st Regiment, at Aldershot and Portsmouth; the 1st Battalion 5th, at Aldershot and Shorncliffe; and the 1st Battalion 10th, at Dublin, the Curragh, and Kilkenny.

Re-Vaccination.—During the year 3,831 soldiers and 6,846 recruits were vaccinated, with the following results. The numbers from which the ratios have been calculated will be found in Abstract No. II. of the Appendix:—

	Total number Vaccinated.	Results.	Ratio per 1,000.				
			In those who bore marks of previous Small-Pox.	In those who bore good marks of previous Vaccination.	In those who bore doubtful marks of previous Vaccination.	In those who bore no marks of previous Vaccination or Small-pox.	Total.
Soldiers, not Recruits	3,831	A perfect Vaccine Pustule	340·4	352·9	452·2	529·7	381·1
		A modified ditto	186·7	186·4	233·1	161·5	190·3
		A failure in	472·9	460·7	314·7	308·8	428·6
		Total..	1000·	1000·	1000·	1000·	1000·
Recruits ..	6,846	A perfect Vaccine Pustule	284·1	361·5	554·6	552·2	376·1
		A modified ditto	222·5	245·5	233·3	302·8	246·6
		A failure in	493·4	393·	212·1	145·	377·3
		Total..	1000·	1000·	1000·	1000·	1000·

The proportion of cases in which the result was a perfect vaccine pustule has been greater than in 1862 among the soldiers, but less among the recruits, and the failures among the latter have also been more numerous. Among the recruits, however, who bore no marks, or only doubtful marks, of previous vaccination, there has been an increase in the number of successful cases.

During the year, in an average force of 75,945 men, there were 123 cases of small-pox, of which 6 died—the deaths being, consequently, in the proportion of 5 per cent. The men attacked are all stated to have borne marks of previous vaccination.

The state of vaccination among the recruits found fit for service at the head-quarters of the recruiting districts, is shown in the following Table:—

United Kingdom.

Recruiting Districts.	Marks of Small Pox.	Marks of Vaccination.	No satisfactory Marks.	Proportion in every 1,000.		
				Marks of Small Pox.	Marks of Vaccination.	No satisfactory Marks.
London	113	1,643	67	62·	901·2	36·8
Liverpool	61	543	95	87·3	776·8	135·9
Bristol	70	411	73	126·3	741·9	131·8
York and Leeds ..	55	362	54	116·8	768·6	114·6
Edinburgh	44	390	65	88·2	781·5	130·3
Glasgow	137	587	23	183·4	785·8	30·8
Belfast	27	401	1	62·9	934·8	2·3
Dublin	71	815	1	80·1	918·8	1·1
Cork	15	293	..	48·7	951·3	..
Total England ..	299	2,959	289	84·3	834·2	81·5
Scotland ..	181	977	88	145·3	784·1	70·6
Ireland ..	113	1,509	2	69·6	929·2	1·2
Total ..	593	5,445	379	92·4	848·5	59·1

This Table shows a larger proportion of men bearing marks of small-pox among the recruits in the English districts than in 1862; and also of those bearing no marks of vaccination in the English and Scotch districts. Liverpool, Bristol, and Edinburgh continue to be the districts in which the largest proportion of unprotected men is found. The proportion, both of those bearing marks of small-pox and of those having no satisfactory marks, is much lower in Ireland than in Great Britain.

Section II.

On the Extent of Invaliding.

The following Table shows the number of men discharged the Service as invalids during the year from the whole of the troops serving at home, and also from the different arms of the Service separately. The ratio discharged during the two preceding years from the former, and in the three preceding years from the latter, is added for the purpose of comparison:—

	Troops generally.	Household Cavalry.	Dragoon Guards and Dragoons.	Royal Artillery (including the Depôt Brigade.)	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Battalions.
Strength	75,945	1,216	9,436	13,748	1,167	4,108	24,331	961	15,852
1863.. Number discharged as Invalids	2,474	20	233	305	36	126	825	14	577
1863.. Ratio per 1,000 ..	32·58	16·44	24·70	22·19	30·85	30·68	33·90	14·56	36·40
1860–62, Ratio per 1,000	46·55 *	11·74	33·04	23·67	29·50	29·76	27·41	56·95	49·54

* The ratio for 1861–2 only.

United Kingdom. As regards the troops generally there has been a considerable reduction in the discharge by invaliding compared with the ratio of the two preceding years. There has been an increase in the Household Cavalry and the Infantry regiments, and a decrease in the Cavalry of the Line, the Cavalry Depôts, and the Depôt Battalions, while in the other arms the ratio closely approximates the average of the three years, 1860-2. The classes of diseases which occasioned the invaliding in the different arms have been already stated in the preceding pages.

Section III.

On the Number constantly Sick in Hospital of the Troops serving in the United Kingdom.

The usual information respecting the number constantly non-effective from sickness, the average sick time to each soldier serving, and the average duration of the cases among the troops generally, and in the different arms of the service respectively, is given in the following Table :—

		Troops generally.	Household Cavalry.	Cavalry of the Line.	Royal Artillery.	Military Train.	Foot Guards.	Infantry Regiments.	Cavalry Depôts.	Depôt Brigade Royal Artillery.	Depôt Battalions.
Mean Daily Sick per 1,000 of strength ..	1863..	49·14	33·52	47·22	46·87	51·61	58·58	40·92	57·15	48·55	45·73
	1860–2	54·31	31·09	42·84	55·28	55·64	53·29	46·58	60·00	88·75	52·88
		Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.
Average Sick Time to each Man in the course of the Year	1863	17·94	12·23	17·24	17·11	18·12	21·38	14·94	20·86	17·71	16·69
	1860–2	19·82	11·35	15·64	20·18	20·31	19·45	17·00	21·90	30·57	19·30
Average duration of the Cases	1863	18·68	19·30	18·74	18·56	16·53	22·35	18·08	17·82	17·88	17·07
	1860–2	19·33	20·41	16·28	20·04	19·26	24·14	19·78	16·62	23·22	19·43

There has been a reduction in all these particulars among the troops generally, compared with the average of the three preceding years. In the Cavalry of the Line there has been an increase in the mean daily sick to the extent of nearly 5 per 1,000 of the strength, but there has at the same time been a decrease in the sick time to each soldier and in the duration of the cases. The Household Cavalry, Royal Artillery, and Foot Guards also show a slight increase in the mean sick, but in the other arms there has been a reduction and particularly in the Depôt Brigade Royal Artillery.

Section IV.

On the Influence of Age on the Mortality of Troops serving in the United Kingdom.

The following Table shows the rate of mortality at different ages in the various arms in 1863, and on the average of the four preceding years; and also the rates in the civil population at corresponding ages. The numbers from which the results for 1863 have been calculated are stated in Abstract No. III. of Appendix.

United Kingdom.

Corps.	Annual Ratio of Deaths per 1,000 Living at the following Ages:—					
	Under 20.	20–24.	25–29.	30–34.	35–39.	40 and upwards.
Household Cavalry	..	7·77	6·92	5·49	12·58	15·27
Dragoon Guards and Dragoons	2·50	4·31	7·53	11·07	19·88	10·83
Royal Artillery	..	4·79	8·48	8·18	11·66	..
Military Train	..	4·04	4·78	..	41·67	..
Foot Guards..	5·17	5·76	9·57	16·49	2·92	48·48
Infantry Regiments	1·03	4·73	8·21	14·44	16·77	30·54
Cavalry Depôts, Depôt and Coast Brigades Royal Artillery, and Depôt Battalions	3·90	6·26	9·96	19·68	20·39	16·90
Ditto, ditto, 1859-62	5·59	10·08	12·85	21·52	27·27	33·82
Average of preceding, exclusive of all Depôts..	1·50	4·75	8·15	12·29	15·24	18·28
Ditto, ditto, 1859-62	3·21	6·46	8·42	11·95	14·35	20·92
Civil Male Population { England and Wales ..	7·41	8·42	9·21	10·23	11·63	13·55
Civil Male Population { Healthy Districts. ..	5·88	7·30	7·98	8·86	9·00	9·86

Compared with the results of the four preceding years, this Table shows a decrease in 1863 in the mortality at all ages in the Depôts, and at all ages, except from 30 to 39, in the average of the troops exclusive of the Depôts. The ratio of deaths under 25 has been lower among the regiments than at the same ages in the healthy districts, and between 25 and 30, lower than among the general male population, but it must be remembered that a proportion of the unhealthy lives even at the earlier ages is got rid of by invaliding. The high death rate above 30 must be taken as an indication of the deterioration of life produced by service in the army, aggravated, particularly in the Depôts, by the effects of residence in unhealthy climates.

Section V.

On the Recruiting for the Army.

1. HEAD-QUARTERS OF RECRUITING DISTRICTS.

During the year 11,487 recruits were inspected at the head-quarters of the recruiting districts, and 5,070 of them, or 441 per 1,000, were rejected as unfit for service. The number of primary inspections was 8,089, and of secondary, 3,398, and the rejections in each were 4,039 and 1,031, being in the ratio of 499 and 303 per 1,000 respectively. Of the recruits in the class of secondary inspections, 2,868 had been previously examined by civil practitioners and 530 by army medical officers, and the rejections were 951 of the former and 80 of the latter, or 331 and 151 per 1,000 of each inspected.

The rejections from both primary and secondary inspections have been in excess of the proportion in 1862.

The total number of recruits examined at the head-quarters of each district, and the proportion rejected, are shown in the following Table, compiled from Abstract No. IV. of Appendix.

United Kingdom.

Districts.	Total Number of Recruits Inspected.	Ratio found unfit for Service of every 1,000 Recruits.			
		Primary Inspections.	Secondary Inspections, previously examined by		Total.
			Army Surg.	Civilians.	
London	3,445	526	209	363	471
Liverpool	1,676	645	145	447	583
Bristol	821	397	143	302	325
Leeds	747	478	146	311	369
Edinburgh	684	304	..	106	270
Glasgow	1,216	390	..	143	386
Dublin	1,667	490	208	379	468
Cork	495	525	84	198	378
Belfast	736	613	94	262	417
Total ..	11,487	499	151	332	441
Ratio in 1862	..	462	178	268	401

This shows an increase on the rejections of the preceding year to the amount of 40 per 1,000 of the recruits examined. It has not, however, been distributed equally among the districts. In the Leeds district it has amounted to 158 per 1,000, and in the Liverpool to 128; while in Edinburgh, Dublin, and Cork there has been a great decrease upon the ratio of 1862.

The native countries of the recruits inspected are shown in the following Table, prepared from Abstract No. V of Appendix:—

Native Countries of Recruits.	Inspected.	Rejected.	Ratio per 1,000 Rejected.	
			1863.	1860–2.
England	5,405	2,482	459	296
Wales	109	36	330	247
Scotland	1,598	582	364	357
Ireland	4,297	1,936	451	319
British Colonies and Foreign Countries .	78	34	436	332
Total ..	11,487	5,070	441	310

This Table shows the rejections, in 1863, to have been highest among the natives of England, and, omitting Wales on account of the very small number, lowest among those of Scotland; their positions in this respect being the converse of the average of the two preceding years.

The relative proportion of recruits furnished by each country was as follows:—

	Of every 1,000 Recruits Inspected.			
	England and Wales.	Scotland.	Ireland.	The Colonies and Foreign Countries.
1863 ..	480	139	374	7
1860–2	553	127	314	6

Compared with the three preceding years there has been a reduction in the proportion of Englishmen enlisted, and an increase in Irish and Scotch, but the proportion of the latter, though above the average, was lower than in 1862.

United Kingdom.

The number enlisted for each arm of the Service, and the proportion rejected, were as follows :—

Corps.	Primary Inspections.			Secondary Inspections.		
	Inspected.	Rejected.	Ratio per 1,000 Rejected.	Inspected.	Rejected.	Ratio per 1,000 Rejected.
Cavalry	1,690	892	528	310	89	287
Artillery	622	288	463	707	217	307
Engineers ..	467	198	424	54	5	93
Military Train ..	..	..	..	..	..	..
Foot Guards ..	81	27	333	3	1	333
Infantry of Line..	5,229	2,634	504	2,324	719	309
Total ..	8,089	4,039	499	3,398	1,031	303

The rejections have therefore been highest among the recruits for the Cavalry, and lowest for the Foot Guards.

The following Table shows the causes of rejection at the primary and secondary inspections respectively in each of the divisions of the United Kingdom.

United Kingdom.

Return showing the Number of Recruits rejected during the Year 1863, with the Causes arranged in Classes, and the Ratio per 1000 in each Class.

Class.	Causes of Rejection, in Classes.	Primary Inspections.						Total.		Secondary Inspections.						Total.	
		4,303		1,773		2,013		8,089		2,386		127		885		3,398	
		England.		Scotland.		Ireland.		United Kingdom.		England.		Scotland.		Ireland.		United Kingdom.	
		Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
1	Syphilis	69	16·04	18	10·15	24	11·92	111	13·72	13	5·45	..	..	2	2·26	15	4·41
2	Other Zymotic Diseases	1	·23	..	..	3	1·49	4	·49	..	..	..	..	1	1·13	1	·29
3	Scrofula	17	3·95	15	8·46	8	3·97	40	4·94	7	2·93	..	..	..	..	7	2·06
4	Phthisis	19	4·42	4	2·26	35	17·39	58	7·17	11	4·61	..	..	8	9·04	19	5·59
5	Other Constitutional Diseases	5	1·16	..	..	13	6·46	18	2·23	..	..	..	..	2	2·26	2	·59
6	Diseases of Brain, Spinal Cord, and Nerves ..	3	·70	..	..	..	..	3	·37	1	·42	..	..	..	..	1	·29
7	Diseases of Eyes and Eyelids	274	63·68	46	25·94	92	45·70	412	50·93	110	46·10	1	7·87	41	46·33	152	44·73
8	Diseases of Nose and Mouth	6	1·39	5	2·82	4	1·99	15	1·85	4	1·68	..	..	2	2·26	6	1·77
9	Diseases of Ears	5	1·16	1	·56	..	..	6	·74	2	·84	..	..	..	..	2	·59
10	Deafness	4	·93	4	2·26	1	·50	9	1·11	1	·42	..	..	..	..	1	·29
11	Impediment of Speech	3	·70	..	..	6	2·98	9	1·11	..	..	..	..	1	1·13	1	·29
12	Disease of Heart	140	32·54	11	6·20	9	4·47	160	19·78	35	14·67	..	..	7	7·91	42	12·36
13	Disease of Arteries (Aneurism)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
14	Disease of Veins (Varix)	303	70·42	67	37·79	150	74·52	520	64·28	62	25·98	1	7·87	15	16·95	78	22·95
15	Disease of Lungs (except Phthisis)	1	·23	1	·56	5	2·48	7	·86	..	..	..	..	4	4·52	4	1·18
16	Small or Malformed Chest, and Curvature of Spine	186	43·23	33	18·61	155	77·00	374	46·24	48	20·12	..	..	35	39·55	83	24·43
17	Loss or Decay of many Teeth	165	38·35	47	26·51	14	6·95	226	27·94	69	28·92	1	7·87	2	2·26	72	21·19
18	Hernia	67	15·57	13	7·33	12	5·96	92	11·37	16	6·71	..	..	1	1·13	17	5·00
19	Laxity of Abdominal Rings, showing tendency to Hernia	96	22·31	15	8·46	29	14·41	140	17·31	40	16·76	..	..	11	12·43	51	15·01
20	Hæmorrhoids	19	4·42	5	2·82	..	..	24	2·97	8	3·35	..	..	..	..	8	2·35

RETURN, &c.—*continued.*

Class.	Causes of Rejection, in Classes.	Primary Inspections.						Total.		Secondary Inspections.						Total.	
		England.		Scotland.		Ireland.		United Kingdom.		England.		Scotland.		Ireland.		United Kingdom.	
		Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
21	Diseases of the Urinary Organs	20	4·65	..	..	..	..	20	2·47	4	1·68	..	..	..	..	4	1·18
22	Varicocele	259	60·19	37	20·87	101	50·17	397	49·08	89	37·30	..	..	20	22·60	109	32·08
23	Hydrocele	9	2·09	2	1·13	..	..	11	1·36	..	..	..	..	..	..	..	..
24	Other Diseases of the Genital Organs (not Venereal)	32	7·44	9	5·08	1	·50	42	5·19	10	4·19	..	..	..	..	10	2·94
25	Muscular Tenuity	183	42·53	86	48·51	39	19·37	308	38·08	49	20·54	1	7·87	10	11·30	60	17·66
26	Debility	6	1·93	1	·56	37	18·38	44	5·44	1	·42	..	..	6	6·78	7	2·06
27	Defects of Upper Extremities, from Fracture, Contraction, Luxation, &c.	47	10·92	39	22·00	19	9·44	105	12·98	27	11·32	..	..	1	1·13	28	8·24
28	Defects of Lower Extremities, from Fracture, Contraction, Luxation, &c.	183	42·53	63	35·53	171	84·95	417	51·55	103	43·17	3	23·62	52	58·76	158	46·50
29	Diseases of Joints	4	·93	1	·56	6	2·98	11	1·36	1	·42	..	..	..	..	1	·29
30	Other Affections of Bones and Muscles	5	1·16	1	·56	4	1·99	10	1·24	2	·84	1	7·87	..	..	3	·88
31	Ulcers, Wounds, and Cicatrices	103	23·94	19	10·72	39	19·37	161	19·90	28	11·74	1	7·87	4	4·52	33	9·71
32	Other Affections of the Cutaneous System ..	15	3·49	23	12·97	12	5·96	50	6·18	5	2·10	1	7·87	2	2·26	8	2·35
33	Weakness of Intellect	..	..	1	·56	1	·50	2	·25	1	·42	..	..	..	..	1	·29
34	Malformation of Ears	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
35	" Nose and Mouth	..	..	1	·56	..	..	1	·12	..	..	..	..	..	..	..	..
36	" Chest and Spine	11	2·56	21	11·84	2	·99	34	4·20	4	1·68	2	15·75	..	..	6	1·77
37	" Urinary and Genital Organs ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
38	Marks of Punishment or letters D or B C.. ..	10	2·32	3	1·69	11	5·46	24	2·97	6	2·51	..	..	..	..	6	1·77
39	Unsound Health, Marks of Cupping, Blistering, &c.	88	20·45	50	28·20	36	17·88	174	21·51	27	11·32	..	..	8	9·04	35	10·30
	Total	2358	547·99	642	362·09	1039	516·14	4039	499·32	784	328·58	12	94·49	235	265·53	1031	303·41

United Kingdom.

United Kingdom.

Comparing these with the results for 1862, it will be found that the disabilities in which a marked increase is shown in the primary inspections have been diseases of the eyes, varicose veins, and defective teeth; and, in the secondary inspections, from diseases of the eyes, small or malformed chest, varicocele, and defective condition of lower extremities. It is probable that the increase in the number rejected under diseases of the eyes has been the result of greater attention in examining into the range of vision of the recruits with reference to their seeing the "centre" of the target at rifle practice. The increase under this cause of rejection has been almost confined to the English districts.

The following Table, prepared from Abstract No. VI. of Appendix, shows the proportion of recruits at different ages in the total number inspected:—

	Boys under 17.	17 to 18.	18 to 19.	19 to 20.	20 to 21.	21 to 22.	22 to 23.	23 to 24.	24 to 25.	25 and upwards.
Proportion in 10,000	290	508	2,826	1,809	1,316	846	848	613	703	241

The proportion of boys under seventeen, and of men above twenty-five has been lower than in 1862. At the intermediate ages there has been a larger proportion under, and a smaller above, twenty-one years of age.

The standard for recruits during 1863 remained unchanged, the minimum height being 5 feet 6 inches, except for the Military Train, Artillery and Engineer drivers, and stonecutters and bricklayers for the Royal Engineers. Detailed information as to the numbers inspected will be found in Abstract No. VI. of Appendix, from which the following summary has been framed, showing the proportion at each height in 10,000 men.

	Ft.	In.		Ft.	In.	
Under	5	3				365
	5	3	to	5	4	157
	5	4	,,	5	5	251
	5	5	,,	5	6	691
	5	6	,,	5	7	4,049
	5	7	,,	5	8	2,232
	5	8	,,	5	9	1,162
	5	9	,,	5	10	641
	5	10	,,	5	11	259
	5	11	,,	6	0	136
	6	0	and upwards			57

The following Table, compiled from Abstract No. VII. of Appendix, shows the proportion of men at the different weights enlisted during 1863:—

	lbs.		lbs.	
Under	100			280
From	100	to	110	134
,,	110	,,	120	1,002
,,	120	,,	130	2,610
,,	130	,,	140	3,050
,,	140	,,	150	1,786
,,	150	,,	160	777
,,	160	,,	170	286
,,	170	and upwards		75
				10,000

The extent of education among the district recruits in 1863 is shown in the following Table, condensed from Abstract No. VIII. of Appendix, in which the numbers are given for each of the recruiting districts:—

United Kingdom.

Of every 1,000 Recruits Examined.	Unable to Read or Write.	Able to Read only.	Able to Read and Write.
In English Districts	290	70	640
In Scotch "	182	166	652
In Irish "	319	93	588
Total ..	280	91	629

Compared with the results for 1862, there is a larger proportion of uneducated men in the English and Scotch districts, but in Ireland it is nearly identical in the two years.

United Kingdom.

The occupations of the recruits in 1863 were as follows:—

Occupations of Recruits.		England.		Scotland.		Ireland.		Total.	
		Number Examined and Rejected.	Ratio per 1,000 of each Class Rejected.	Number Examined and Rejected.	Ratio per 1,000 of each Class Rejected.	Number Examined and Rejected.	Ratio per 1,000 of each Class Rejected.	Total Number Examined and Rejected.	Total Ratio per 1,000 of each Class Rejected.
1. Labourers, Husbandmen, and Servants	Number inspected	3,756	..	705	..	1,937	..	6,398	..
	„ rejected	1,736	462	227	322	833	430	2,796	437
2. Manufacturing Artisans (as Clothworkers, Weavers, Lace Makers, &c.)	„ inspected	1,009	..	171	..	249	..	1,429	..
	„ rejected	526	521	57	333	112	450	695	486
3. Mechanics employed in Occupations favourable to physical development (as Carpenters, Smiths, Masons, &c.)	„ inspected	1,094	..	798	..	410	..	2,302	..
	„ rejected	525	480	301	377	211	515	1,037	450
4. Shopmen and Clerks.. ..	„ inspected	599	..	206	..	124	..	929	..
	„ rejected	288	481	66	320	61	492	415	447
5. Professional Occupations, Students	„ inspected	41	..	14	..	41	..	96	..
	„ rejected	12	293	3	214	21	512	36	375
6. Boys	„ inspected	190	..	6	..	137	..	333	..
	„ rejected	55	289	..	..	36	263	91	273
Total Inspected		6,689	..	1,900	..	2,898	..	11,487	..
Total Rejected		3,142	470	654	344	1,274	440	5,070	441

United Kingdom.

The increase in the proportion rejected has been distributed over all the classes except the fourth and fifth, which include shopmen, clerks, and professional occupations. In the English districts it has extended to the fourth also. In Scotland there has been a decrease in the rejections in the second and fourth classes; and in Ireland, in the first, second, and third, but an increase in the other three classes.

Of every 1,000 recruits examined, the proportion furnished by each group of occupations was as follows:—

Occupations of Recruits.	Of every 1,000 Recruits examined in—			
	England.	Scotland.	Ireland.	United Kingdom
1. Labourers, Husbandmen, and Servants ..	561	371	668	557
2. Manufacturing Artisans (as Clothworkers, Weavers, Lace Makers, &c.)	151	90	86	124
3. Mechanics employed in Occupations favourable to Physical Development (as Carpenters, Smiths, Masons, &c.)	164	420	142	201
4. Shopmen and Clerks	90	109	43	81
5. Professional Occupations, Students ..	6	7	14	8
6. Boys	28	3	47	29

This Table shows an increase in the proportion of labourers enlisted in all the three divisions of the Kingdom. There has also been an increase in the proportion of shopmen and clerks in Scotland and Ireland, and of mechanics in Ireland.

2. Regiments and Depôts.

During the year 1863 there were 14,057 recruits inspected at the regiments and Depôt Battalions. Of these, 6,778 underwent primary inspection, of whom, 2,827 were rejected; and 7,279 underwent secondary inspection, of whom 395 were rejected. These numbers give the ratio of 417 rejections per 1,000 of primary inspections, and 54 per 1,000 of secondary. Of the secondary inspections 6,751 were of men previously examined by army medical officers, and 528 by civilians. The rejections of these were 255 and 140, or in the ratio of 38 and 265 per 1,000 respectively.

The numbers inspected and rejected in each arm of the Service were as follows:—

United Kingdom.

	Primary Inspections.			Secondary Inspections.						Total Inspected.	Total Rejected.	Ratio per 1,000.
				Previously Examined by Army Surgeons.			Previously Examined by Civilians.					
	Inspected.	Rejected.	Ratio per 1,000.	Inspected.	Rejected.	Ratio per 1,000.	Inspected.	Rejected.	Ratio per 1,000.			
Household Cavalry	243	104	428	2	..	..	..	..	..	245	104	424
Dragoon Guards and Dragoons	587	184	313	765	16	21	6	..	..	1,358	200	147
Royal Artillery	2,567	1,226	478	825	14	17	..	..	..	3,392	1,240	366
Royal Engineers	231	69	299	301	7	23	..	..	..	532	76	143
Military Train	54	19	352	..	..	..	..	..	..	54	19	352
Foot Guards	147	71	483	247	59	239	258	68	264	652	198	304
Infantry Regiments	755	325	430	17	2	118	..	..	..	772	327	424
Cavalry Depôts	263	156	593	263	7	27	..	..	..	526	163	310
Depôt Battalions	1,931	673	349	4,331	150	35	264	72	273	6,526	895	137
Total	6,778	2,827	417	6,751	255	38	528	140	265	14,057	3,222	229

United Kingdom.

The highest ratio of rejections on primary inspection has been at the Cavalry Depôts, and next to these are the Foot Guards and Royal Artillery. Compared with the proportion rejected for the different arms at the head-quarters of recruiting districts, it appears that at the regiments it is much lower in the Cavalry, Royal Engineers, and Infantry, that there is very little difference in the Royal Artillery, and that it is higher in the Foot Guards; but the number of the last examined at the recruiting districts is too small to justify any positive deduction.

The preceding Table still shows a very low proportion of rejections at the secondary inspections, when the primary had been made by army surgeons.

The native countries of the recruits are shown in the following Table:—

Native Countries of Recruits.	Inspected.	Rejected.	Ratio per 1,000 Rejected.
England	7,876	2,067	262
Wales	129	26	202
Scotland	1,511	233	154
Ireland	4,418	872	197
British Colonies and Foreign Countries ..	123	24	195
Total	14,057	3,222	229

The relative proportion of the recruits of each country rejected at the regiments and depôt battalions, bears a close relation to that at the head-quarters of districts.

The proportion of recruits furnished by each country in every 1,000 examined was—

From England and Wales	569
Scotland	108
Ireland	314
Colonies and Foreign Countries	9

This shows a slight decrease from Scotland, and corresponding increase for Ireland, compared with 1862; the proportion for England and Wales being the same as in that year.

The following Table shows the relative prevalence of the different classes of disabilities among the recruits.

United Kingdom.

Class.		Primary Inspections.		Secondary Inspections.			
				Previously Examined by Army Medical Officer.		Previously Examined by Private Medical Practitioner.	
	Number Inspected	6,778		6,751		528	
Class.	Causes of Rejection, in Classes.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
1	Syphilis	97	14·31	10	1·48	6	11·37
2	Other Zymotic Diseases	17	2·51	..	..	1	1·89
3	Scrofula	51	7·52	8	1·19	3	5·68
4	Phthisis	38	5·61	10	1·48	6	11·37
5	Other Constitutional Diseases	62	9·15	4	·59	4	7·58
6	Diseases of Brain, Spinal Chord, and Nerves	4	·59	1	·15	..	..
7	Diseases of Eyes and Eyelids	177	26·11	35	5·18	12	22·73
8	Diseases of Nose and Mouth	4	·59	..	..	1	1·89
9	Disease of Ears	4	·59	..	..	..	..
10	Deafness	8	1·18	..	..	1	1·89
11	Impediment of Speech	7	1·03	1	·15	..	..
12	Disease of Heart	130	19·18	20	2·96	11	20·83
13	Disease of Arteries (Aneurism)	1	·15	..	..	..	..
14	Disease of Veins (Varix)	251	37·03	16	2·37	15	28·41
15	Disease of Lungs (except Phthisis)	24	3·54	8	1·19	1	1·89
16	Small or Malformed Chest, and Curvature of Spine	379	55·92	17	2·52	19	35·99
17	Loss or Decay of many Teeth	134	19·77	4	·59	..	..
18	Hernia	102	15·05	9	1·33	2	3·79
19	Laxity of Abdominal Rings, showing tendency to Hernia	119	17·56	6	·89	2	3·79
20	Hæmorrhoids	4	·59	..	..	..	..
21	Diseases of Urinary Organs	13	1·92	..	..	1	1·89

United Kingdom.

Class.	Causes of Rejection, in Classes.	Primary Inspections.		Secondary Inspections.			
				Previously Examined by Army Medical Officer.		Previously Examined by Private Medical Practitioner.	
		Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.	Number Rejected.	Ratio per 1,000.
22	Varicocele	171	25·23	16	2·37	5	9·47
23	Hydrocele	4	·59	2	·30	1	1·89
24	Other Diseases of the Genital Organs (not Venereal)	23	3·39	..	..	..	..
25	Muscular Tenuity	275	40·57	8	1·19	1	1·89
26	Debility	58	8·56	13	1·92	6	11·37
27	Defects of Upper Extremities, from Fracture, Contraction, Luxation, &c. ..	66	9·74	7	1·04	3	5·68
28	Defects of Lower Extremities, from Fracture, Contraction, Luxation, &c. ..	172	25·38	21	3·11	14	26·52
29	Diseases of Joints	35	5·16	4	·59	1	1·89
30	Other Affections of Bones and Muscles	32	4·72	10	1·48	2	3·79
31	Ulcers, Wounds, and Cicatrices	102	15·05	6	·89	3	5·68
32	Other Affections of the Cutaneous System	23	3·39	1	·15	2	3·79
33	Weakness of Intellect	6	·88	3	·44	3	5·68
34	Malformation of Ears	..	..	..	..	..	..
35	" Nose and Mouth	2	·29	1	·15	..	..
36	" Chest and Spine	39	5·75	1	·15	1	1·89
37	" Urinary and Genital Organs	1	·15	..	..	..	..
38	Marks of Punishment or of letters D or B C	17	2·51	..	..	2	3·79
39	Unsound Health	171	25·23	13	1·92	11	20·84
40	Too Short	4	·59	..	..	..	..
	Total	2,827	417·68	255	37·77	140	265·15

United Kingdom.

On comparing the causes of rejection at the primary inspections with those recorded in the recruiting districts, it will be found that the proportion deemed unfit at the regiments on account of diseases of the eyes and eyelids, varicose veins, varicocele, and defective condition of the lower extremities, is much lower than at the head-quarters of the districts; and that the proportion refused on account of small or malformed chest is higher.

The following table shows the ages of the recruits inspected:—

	Boys under 17.	17 to 18.	18 to 19.	19 to 20.	20 to 21.	21 to 22.	22 to 23.	23 to 24.	24 to 25.	25 and Upwards.
Number Inspected* ..	670	989	4,519	2,619	1,710	1,063	880	661	563	357
Proportion in 10,000 ..	478	705	3,221	1,866	1,219	758	627	471	401	254

Compared with the corresponding Table in the Report for 1862, this shows a much larger proportion of recruits between 18 and 19 years of age; and, compared with the results in the districts, it also shows that at the regiments the proportion of recruits under 20 is considerably greater than at the recruiting districts.

The number of recruits inspected is shown in the following Table, according to their height:—

	Under 5 ft. 3.	5 ft. 3 to 5 ft. 4.	5 ft. 4 to 5 ft. 5.	5 ft. 5 to 5 ft. 6.	5 ft. 6 to 5 ft. 7.	5 ft. 7 to 5 ft. 8.	5 ft. 8 to 5 ft. 9.	5 ft. 9 to 5 ft. 10.	5 ft. 10 to 5 ft. 11.	5 ft. 11 to 6 ft.	6 ft. and upwds.
Boys under 17 ..	593	83	12	16	10	..	1	..	..	..	..
Between 17 and 18 ..	51	35	85	181	440	140	62	23	10	11	1
Between 18 and 19 ..	52	169	457	652	1,649	742	441	190	68	56	42
Between 19 and 20 ..	13	18	219	349	741	582	352	167	77	51	50
Between 20 and 21 ..	7	8	181	198	439	362	224	148	73	27	43
Between 21 and 22 ..	..	4	53	103	265	218	181	121	59	29	30
Between 22 and 23 ..	..	1	28	58	205	220	157	109	45	22	35
Between 23 and 24 ..	..	3	22	66	151	154	108	77	36	26	18
Between 24 and 25 ..	..	1	14	48	118	121	123	79	27	16	16
25 and upwards ..	2	..	6	21	58	73	69	43	36	20	28
Total†	718	272	1,027	1,692	4,076	2,612	1,718	957	431	258	263
Proportion in 10,000	512	194	732	1,207	2,906	1,863	1,225	682	307	184	188

Compared with 1862, this Table shows a great decrease in the proportion under 5 feet 4 inches, but an increase between 5 feet 5 inches, and 5 feet 6 inches. There is also a slight decrease in the proportion at the various heights above 5 feet 7 inches.

The state of education of the recruits enlisted at the regiments and depôts was as follows:—

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* The difference of 26 between these and the numbers shown in a previous Table arises from an omission in the Return of the 2nd Battalion 25th Regiment.

† A difference of 33 between the number of recruits shown here and in previous Tables arises from omissions in the returns of the 2nd Battalion 25th Regiment, the 61st Regiment, and the 7th Brigade Royal Artillery.

United Kingdom.

	Unable to Read or Write.	Able to Read only.	Able to Read and Write.
Number Inspected	3,050	1,320	9,670
Proportion in 1,000	217	94	689

This shows a smaller proportion unable to read and write than among the district recruits, but a larger proportion than in the regimental returns for 1862. If the extent of education among the recruits inspected in the different arms of the service be tested by the number unable to read and write, it will stand thus—

Royal Engineers	2	per 1,000.
Household Cavalry	8	
Cavalry of Line	10	
Cavalry Depôts	13	
Military Train	15	
Foot Guards	18	
Infantry Regiments	22	
Royal Artillery	25	
Depôt Battalions	26	

The occupations of the recruits inspected, and the numbers of each rejected, were as follows:—

United Kingdom.

TABLE showing the Occupations of the Recruits Inspected and the Numbers Rejected of each Class.

Occupations of Recruits.	Primary Inspections.			Secondary Inspections.			Total.		
	Number Inspected.	Number Rejected.	Ratio per 1,000 Rejected.	Number Inspected.	Number Rejected.	Ratio per 1,000 Rejected.	Number Inspected.	Number Rejected.	Ratio per 1,000 Rejected.
1. Labourers, Husbandmen, and Servants..	3,512	1,520	433	4,039	226	56	7,551	1,746	231
2. Manufacturing Artisans, as Clothworkers, Weavers, Lacemakers, &c...	907	418	461	1,038	63	61	1,945	481	247
3. Mechanics employed in Occupations favourable to physical development, as Smiths, Masons, &c... ..	1,356	580	428	1,427	71	50	2,783	651	234
4. Shopmen and Clerks	520	227	437	490	29	59	1,010	256	253
5. Professional Occupations, Students, &c...	100	34	340	52	4	77	152	38	250
6. Boys	383	48	125	233	2	9	616	50	81
Total	6,778	2,827	417	7,279	395	54	14,057	3,222	229

United Kingdom.

The rejections have fallen pretty equally upon all classes, except the boys, who may be regarded as exceptional cases being all enlisted by special authority. The difference between the number of them as shown in this and some of the previous Tables is probably due to some of them, although enlisted as boys, being included in the other classes, from having been employed in trades previously to their enlistment.

The relative proportion of recruits furnished by each class of occupations has been as follows:—

Occupation of Recruits.	Ratio per 1,000 of Recruits Examined.
1. Labourers, Husbandmen, and Servants	537
2. Manufacturing Artisans, as Clothworkers, Weavers, Lacemakers, &c.	138
3. Mechanics employed in Occupations favourable to physical development, as Smiths, Masons, &c.	198
4. Shopmen and Clerks	72
5. Professional Occupations, Students, &c..	11
6. Boys	44

These results do not differ materially from those of the recruiting districts. In the latter, the proportion of labourers is rather higher, and of artizans and boys lower, than at the regiments. Compared with 1862 there has been a decrease in the third, and an increase in the second group.

II.—ON THE HEALTH OF THE TROOPS SERVING IN THE MEDITERRANEAN.

Section I.—Sickness and Mortality.

I.—Gibraltar.

Gibraltar. In September the 2nd Battalions of the 7th and 8th Regiments, and in October the 100th Regiment, embarked for Malta, and were replaced at Gibraltar by the 2nd Battalions of the 15th and 23rd Regiments, and the 4th Battalion Rifle Brigade, from that Island.

The average strength of the troops composing the garrison during 1863 was 5,347. The admissions into hospital amounted to 4,691; the deaths in hospital to 23, and out of it to 2; and 2 invalids died at the invalid depôt, making a total of 27 deaths. These numbers give a proportion of 877 admissions and 5·05 deaths per 1,000 of mean strength, the former being identical with that of 1862, and the latter 2¼ per 1,000 under it.

The following Table shows the admissions and deaths in each of the corps. The correction necessary to show the average annual strength has been made in those which arrived at or left Gibraltar during the year:—

Corps.	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000 of Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	921	811	3	..	..	3	880	3·26
Royal Engineers	317	248	1	..	..	1	782	3·15
2nd Battalion 2nd Regiment ..	824	1,003	5	..	..	5	1,217	6·07
" " 3rd " ..	838	493	4	1	..	5	588	5·97
, " 7th " ..	583	536	1	..	..	1	915	1·71
" 8th " ..	625	579	3	..	1	4	926	6·40
" " 15th " ..	172	90	3	..	..	3	523	17·44
" " 23rd " ..	137	60	..	..	..	..	438	..
100th Regiment	657	744	2	1	1	4	1,132	6·09
4th Battalion Rifle Brigade ..	232	116	..	..	..	..	500	..

The other death was that of a private of the Commissariat Staff Corps.

The admissions have been very high in the 2nd and 100th Regiments. The latter was in Gibraltar during nine months and a-half only, and these included the period of the year when the sickness is great; but, making every allowance for this, the admissions were considerably in excess of the average. The rate of mortality in the 15th Regiment appears very high; but this is merely an irregularity depending upon the very short period of observation, the corps having been in this garrison only 2¼ months.

The following Table shows the classes of diseases by which the sickness and mortality were caused. The details for 1863 will be found in No. IX. of Appendix:—

Gibraltar.

Orders.	Diseases.	1863. Average Strength, 5,347.						1859-62.		1863. Infantry at Home.	
			Deaths.			Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
		Admitted into Hospital.	At Gibraltar.	Of Invalids.	Total Died.	Admitted.	Died.	Admitted.	Died.	Admitted	Died.
	Class I.										
1	Miasmatic Diseases ..	1,531	8	..	8	286·3	1·50	284·3	4·82	154·1	·61
2	Enthetic " ..	681	..	..	..	127·4	..	212·2	..	277·0	·16
3	Dietic " ..	112	..	..	..	20·9	..	13·2	·18	4·8	..
4	Parasitic " ..	49	..	..	..	9·2	..	8·1	..	35·8	..
	Class II.										
1	Diathetic Diseases ..	26	1	..	1	4·9	·19	3·4	·05	2·5	·08
2	Tubercular " ..	50	1	2	3	9·3	·56	6·7	1·15	15·2	2·55
	Class III. Diseases of the—										
1	Nervous System ..	122	2	..	2	22·8	·38	19·2	·23	14·6	·70
2	Circulatory " ..	68	3	..	3	12·7	·56	6·1	·64	8·7	·90
3	Respiratory " ..	335	3	..	3	62·6	·56	55·8	·09	63·0	1·10
4	Digestive " ..	272	4	..	4	50·9	·74	38·2	·23	34·0	·49
5	Urinary " ..	9	..	..	..	1·7	..	3·1	·23	1·9	·16
6	Reproductive " ..	98	..	..	..	18·3	..	16·3	..	11·1	..
7	Locomotive " ..	25	..	..	..	4·7	..	4·7	·09	3·2	..
8	Integumentary " ..	730	..	..	..	136·5	..	136·6	..	109·2	..
	Class IV.										
4	Diseases of Nutrition	18	..	..	..	3·4	..	1·5	..	1·3	·04
	Class V.										
1	Accidents	528	3	..	3	98·8	·56	76·9	·41	68·3	·65
3	Homicide	..	..	..	..	..	..	..	·14	·04	·08
4	Suicide	2	..	..	..	·4	..	·2	·46	·12	·12
5	Execution	..	..	..	..	..	..	..	·14	..	..
6	Corporal Punishment	29	..	..	..	5·4	..	3·1	..	2·2	..
	Diseases not stated ..	..	..	..	..	..	..	3·4	..	..	..
	Malingering	..	..	..	..	..	..	..	..	·04	..
	No appreciable Disease	6	..	..	..	1·1	..	·7	..	·2	·04
	Total	4,691	25	2	27	877·3	5·05	893·7	8·86	807·3	7·68

This shows a slight decrease in the admissions into hospital, and a marked reduction in the mortality in 1863 compared with the average of the four preceding years; the former has been exclusively in venereal, and the latter chiefly in miasmatic diseases, and to a slight extent also in tubercular. The reduction in venereal has, to some extent, been counter-balanced by an increase in the admissions by accidents and by diseases of the digestive system.

MIASMATIC DISEASES have furnished exactly the average number of cases. When subdivided into groups the following results are obtained:—

Gibraltar.

Miasmatic Diseases.	Admitted.	Died.	Annual ratio per 1,000. 1863. Admitted.	1863. Died.	1859–62. Admitted.	1859–62. Died.
Eruptive Fevers	5	..	·9	..	1·6	·23
Paroxysmal ,,	51	..	9·5	..	6·4	·18
Continued ,,	615	7	115·0	1·31	94·1	2·62
Dysentery, Diarrhœa, and Cholera	191	..	35·7	..	73·0	1·75
Sorethroat and Influenza	139	..	26·0	..	18·9	..
Ophthalmia	216	..	40·4	..	40·9	..
Rheumatism	220	1	41·1	·19	38·5	..

This shows an increase in the prevalence of continued fevers, and a decrease in dysentery and diarrhœa. The mortality by continued fevers has amounted to only half the average of the four preceding years. Fevers of this type were most prevalent in the 2nd and 8th Regiments, and were believed to depend, in a great measure, on the overcrowded state of the barracks and the defective sanitary arrangements of the garrison as regards drains and sewers.

ENTHETIC DISEASES.—There has been a reduction in the prevalence of venereal to the extent of 56 per 1,000, compared with the ratio in 1862. The principal Medical Officer expresses himself unable to account for it, as no alteration has taken place in the police regulations for the surveillance of the prostitutes.

DIETIC DISEASES.—The admissions by these diseases have been greatly in excess of the average. The increase has been due to the number of cases of intemperance admitted into the hospital of the 100th Regiment, 65 out of 111 cases having occurred in that corps.

DISEASES OF THE INTEGUMENTARY SYSTEM were very prevalent in the 2nd Regiment, chiefly in the form of boils, abscesses, and ulcers. The Surgeon of the corps does not assign any probable reason for this excess.

The other classes of diseases no not seem to require any remark.

II.—MALTA.

Malta.

In September the 2nd Battalions of the 7th and 8th Regiments, and in October the 100th Regiment arrived from Gibraltar to relieve the 2nd Battalions of the 15th and 23rd, and the 4th Battalion Rifle Brigade, which replaced them in that garrison.

The average strength of the troops during the year, exclusive of the Royal Malta Fencible Artillery, was 5,757; the admissions into hospital amounted to 3,832; the deaths in hospital to 30; out of hospital to 9; and among invalids on their passage or at the invalid depôt 3, making a total of 42. The proportion of admissions, therefore, was 666, and of deaths 7·31 per 1,000 of mean strength, both of them being under that of 1862.

The admissions and deaths in each corps are shown in the following Table:—

Malta.

Corps.	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	584	306	1	..	..	1	524·0	1·71
Royal Engineers	194	202	..	..	..	..	1041·4	..
2nd Battalion 7th Regiment ..	246	300	1	..	..	1	1219·5	4·06
" " 8th " ..	204	278	..	..	..	..	1362·8	..
" " 15th " ..	610	404	6	2	1	9	662·3	14·75
1st " 22nd " ..	806	569	4	1	..	5	705·9	6·20
2nd " " " ..	813	443	1	1	2	4	544·9	4·92
" " 23rd " ..	695	463	2	1	..	3	666·2	4·32
1st " 25th " ..	761	399	7	2	..	9	524·3	11·83
100th Regiment	167	180	..	1	..	1	1077·8	5·99
4th Battalion Rifle Brigade ..	601	188	4	..	..	4	312·8	6·65

The other five deaths occurred among the men of the Army Hospital Corps, one of them out of hospital.

Owing to the many changes in the corps composing the garrison, any deductions as to the comparative sickness and mortality in them would be liable to exception.

The influence of the different classes of diseases on the troops is shown in the following Table. The details for 1863 will be found in Abstract No. IX. of Appendix:—

Malta.

Orders.	Diseases.	1863.—Strength, 5,757.						1859–62.	
		Admitted into Hospital.	Deaths.		Total Died.	Annual ratio per 1,000 of Strength.		Annual ratio per 1,000 of Strength.	
			In Malta.	Of Invalids.		Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases..	1,626	9	..	9	282·4	1·56	419·5	5·98
2	Enthetic „ ..	254	..	..	..	44·1	..	111·1	..
3	Dietic „ ..	57	2	..	2	9·9	·35	8·0	·09
4	Parasitic „ ..	86	..	..	..	14·9	..	12·8	..
	Class II.								
1	Diathetic Diseases..	33	1	..	1	5·7	·17	3·3	·04
2	Tubercular „ ..	66	9	2	11	11·5	1·91	11·3	2·14
	Class III. Diseases of the—								
1	Nervous System ..	72	4	..	4	12·5	·70	16·3	·56
2	Circulatory „ ..	30	2	..	2	5·2	·35	5·2	·51
3	Respiratory „ ..	217	2	1	3	37·7	·52	47·3	·90
4	Digestive „ ..	167	2	..	2	29·0	·35	48·4	·60
5	Urinary „ ..	13	2	..	2	2·3	·35	1·8	·21
6	Reproductive „ ..	68	..	..	..	11·8	..	9·7	..
7	Locomotive „ ..	34	..	..	..	5·9	..	3·5	..
8	Integumentary „ ..	623	..	..	..	108·2	..	135·6	..
	Class IV.								
4	Diseases of Nutrition.	21	..	..	..	3·7	..	·9	..
	Class V.								
1	Accidents	441	2	..	2	76·6	·35	70·8	1·07
4	Suicide	1	4	..	4	·2	·70	·1	·17
5	Execution	..	..	..	..	..	..	..	·04
6	Corporal Punishment	22	..	..	..	3·8	..	2·8	..
	No appreciable disease	1	..	..	..	·2	..	..	..
	Diseases not stated ..	..	..	..	..	..	..	2·9	..
	Total	3,832	39	3	42	665·6	7·31	906·3	12·31

The admissions and deaths have been much under the average of the four preceding years, the difference in the former being chiefly in miasmatic and venereal diseases and those of the integumentary system, and in the latter in miasmatic diseases and accidents. Compared with the results for 1862 there has been a decrease to the extent of 75 per 1,000 in miasmatic diseases, but this is, to some extent, counter-balanced by an increase in those of the integumentary system and in accidents.

MIASMATIC DISEASES.—The admissions and deaths by the principal groups constituting this class were as follows:—

Malta.

Diseases.	1863.		Annual Ratio per 1,000 of Strength.			
			1863.		1859–62.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	3	..	·5	..	1·6	·17
Paroxysmal „	9	..	1·6	..	4·1	..
Continued „	660	6	114·6	1·04	187·7	4·78
Dysentery, Diarrhœa, and Cholera ..	232	3	40·3	·52	73·5	·90
Sorethroat and Influenza	76	..	13·2	..	13·3	..
Ophthalmia..	449	..	78·0	..	81·4	..
Rheumatism	168	..	29·2	..	53·7	·08

The decrease in these diseases has been most marked in continued fevers, dysentery, and diarrhœa, and in rheumatism. Compared with the results for 1862 it will be found to have occurred also in ophthalmia.

Continued Fevers show a marked diminution compared with the average of the preceding years. They have not prevailed in any of the barracks, or in any of the corps, to such an extent as to call for remark, if we except the 2nd Battalion 7th Regiment, quartered in the Isola Gate and Polverista Barracks, and the 2nd Battalion 8th Regiment, quartered in the Verdala Barracks, on their arrival from Gibraltar. The cases were of a mild character, and probably due, in a great measure, to the season of the year at which these corps arrived in the island.

Ophthalmia.—The admissions by this disease were 18 per 1,000 under the proportion in 1862. The measure adopted of sending the men of the 15th Regiment suffering from ophthalmia to the Island of Gozo, which was noticed in last year's Report, was attended with great benefit, the admissions in 1863 having been only one-fourth of the number in 1862. An increase in the cases of ophthalmia having taken place in the 2nd Battalion 23rd Regiment, it was sent to Pembroke Camp for the summer, and the Principal Medical Officer reports the disease to have been checked. The prevalence of the disease in the 2nd Battalion 22nd Regiment having been considerably greater than in 1862, it has been decided to adopt a similar course with it, which, it is to be hoped, will be followed by similar advantageous results.

ENTHETIC DISEASES show a slight reduction upon the low ratio of 1862, and amount to two-fifths only of the average for the five years, 1859–62. The Medical Officers attribute this favourable result to the operation of the system of police surveillance of the prostitutes.

DISEASES OF THE INTEGUMENTARY SYSTEM have been more prevalent than in 1862, though still considerably under the average of the four years 1859–62. The difference has been chiefly in the cases of boils and of ulcers.

ACCIDENTS AND VIOLENCE.—One of the accidental deaths was by drowning, and the other from fracture of the skull, caused by a fall from a battery 27 feet high. Of the four cases of suicide, three were committed by firearms, and one by a young soldier throwing himself over the ramparts; the fatal injuries in the latter case were rupture of the liver and compound fracture of the right thigh.

The other classes of diseases do not appear to require special notice.

ROYAL MALTA FENCIBLE ARTILLERY.

The average strength of this corps during 1863 was 594 non-commissioned officers and men, among whom 496 admissions into hospital and 6 deaths occurred, being respectively in the annual ratio of 835 and 10·09 per 1,000 of the strength. The proportion admitted corresponds very closely with that of 1862, but the deaths have been one-half higher. The influence

Malta. of the different classes of diseases is shown in the following Table. The details for 1863 are given in Abstract No. IX. of Appendix:—

		Royal Malta Fencible Artillery.						Annual Ratio per 1,000 of Strength.	
	Average Strength.	591		Annual Ratio per 1,000.				Line Regiments at Malta. 1863.	
				1,863.		1859–62.			
Orders.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases	122	..	205·4	..	212·3	1·24	282·4	1·56
2	Enthetic "	26	..	48·8	..	57·9	..	44·1	..
3	Dietic "	1	..	1·7	..	..	..	9·9	·35
4	Parasitic "	4	..	6·7	..	3·7	..	14·9	..
	Class II.								
1	Diathetic Diseases	1	..	1·7	..	1·6	..	5·7	·17
2	Tubercular "	2	1	3·4	1·68	4·1	1·23	11·5	1·91
	Class III.								
	Diseases of the—								
1	Nervous System	12	1	20·2	1·68	12·3	·41	12·5	·70
2	Circulatory "	2	1	3·4	1·68	2·1	·41	5·2	·35
3	Respiratory "	47	..	79·1	..	68·7	·41	87·7	·52
4	Digestive "	119	2	200·3	3·37	141·1	·82	29·0	·35
5	Urinary "	1	..	1·7	..	2·1	..	2·3	·35
6	Reproductive "	..	..	..	..	2·1	..	11·8	..
7	Locomotive "	..	..	..	..	..	..	5·9	..
8	Integumentary "	94	..	158·2	..	141·2	..	108·2	..
	Class IV.								
4	Diseases of Nutrition ..	..	..	..	..	..	..	3·7	..
	Class V.								
1	Accidents	62	..	104·4	..	95·1	1·24	78·6	[illegible]
3	Homicide	1	1	1·7	1·68	..	·41	..	..
4	Suicide	1	..	1·7	..	..	..	·2	·70
6	Corporal Punishment ..	1	..	1·7	..	·4	..	3·3	..
	No appreciable disease ..	..	..	..	..	..	..	·2	..
	Total	496	6	835·1	10·09	754·7	6·17	665·6	7·31

The admissions into hospital, though in excess of the average of the four preceding years, have been in nearly the same ratio as in 1862; but as compared with the results of that year, there has been a marked reduction in miasmatic diseases, particularly measles, sorethroat (*tonsillitis*), and rheumatism, and in venereal diseases, but a corresponding increase in bronchitis, dyspepsia, and slight ulcers. The mortality has been considerably above the average, but fluctuations may naturally be anticipated when the numbers under observation are so small.

III.—Ionian Islands.

Ionian Islands. During the year the troops employed in the Ionian Islands consisted of a detachment of the 3rd Brigade Royal Artillery, two Companies Royal Engineers, the 2nd Battalions 4th and 6th Regiments, and the 1st and 2nd Battalions 9th Regiment.

The average strength was 3,906 non-commissioned officers and men, among whom there occurred 2,673 admissions into hospital, 28 deaths in and 2 out of hospital, and one of an invalid on his passage home, making a total of 31 deaths. The admissions into hospital, therefore, were in the ratio of 684, and the deaths of 7·94 per 1,000 of the strength, the former being 85 per 1,000 below, and the latter 2·17 per 1,000 above the proportions in 1862. The following Table shows the admissions and deaths in each corps:—

Regiments.	Mean Strength.	Admitted into Hospital.	Died.				Ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery..	377	253	5	..	..	5	671	18·17
Royal Engineers	197	205	1	..	1	2	1,041	10·15
2nd Battalion 4th Regiment ..	823	423	8	..	..	8	514	9·72
" " 6th " ..	828	736	2	..	..	2	889	2·41
1st " 9th " ..	837	578	6	2	..	8	690	9·56
2nd " " " ..	844	478	5	..	..	5	566	5·88

The other death was that of a Serjeant-Major of the Commissariat Staff Corps.

The admissions and deaths by the different classes of diseases are shown in the following Table. The details for 1863 will be found in Abstract No. IX. of Appendix.

Ionian Islands.

Orders.	Diseases.	1863.—Strength, 3,906.						1859–62.	
		Admitted into Hospital.	Deaths.			Annual Ratio per 1,000 of Strength.		Annual Ratio per 1,000 of Strength.	
			In Ionian Islands.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	898	7	..	7	229·9	1·79	327·8	4·68
2	Enthetic „	449	..	..	..	115·0	..	119·7	·06
3	Dietic „	75	..	..	..	19·2	..	4·7	·13
4	Parasitic „	11	..	..	..	2·8	..	4·6	..
	Class II.								
1	Diathetic Diseases ..	9	2	..	2	2·3	·51	1·3	·19
2	Tubercular „	26	6	..	6	6·7	1·54	10·4	1·27
	Class III. Diseases of the—								
1	Nervous System ..	57	3	..	3	14·6	·77	17·2	·63
2	Circulatory „	20	4	1	5	5·1	1·28	4·8	·44
3	Respiratory „	99	3	..	3	25·3	·77	45·9	·57
4	Digestive „	139	4	..	4	35·6	1·02	42·4	·32
5	Urinary „	15	..	..	..	3·8	..	1·9	..
6	Reproductive „	19	..	..	..	4·9	..	3·4	..
7	Locomotive „	4	..	..	..	1·0	..	3·2	·06
8	Integumentary „	453	..	..	..	116·0	..	137·7	..
	Class IV.								
4	Diseases of Nutrition ..	21	..	..	..	5·4	..	4·0	..
	Class V.								
1	Accidents	372	1	..	1	95·2	·26	73·8	·51
3	Homicide	..	..	..	..	..	..	·1	·06
4	Suicide	..	..	..	..	..	..	·1	·13
5	Execution	..	..	..	..	..	..	..	·06
6	Corporal Punishment ..	6	..	..	..	1·5	..	2·0	..
	Diseases not specified ..	..	..	..	..	..	..	1·7	..
	Total	2,673	30	1	31	684·3	7·94	806·7	9·11

Both admissions and deaths have been considerably under the average of the four preceding years. In the former the difference has been chiefly in miasmatic diseases, and those of the respiratory and integumentary systems, while there has been an increase in the dietic diseases and in accidents. In the deaths, the reduction has taken place in miasmatic diseases, but there has been an increase of those from diseases of the circulatory and respiratory systems.

Miasmatic Diseases.—The prevalence of the principal groups comprised in this class has been as follows:—

Ionian Islands.

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 Strength. 1863. Admitted.	1863. Died.	1859–62. Admitted.	1859–62. Died.
Eruptive Fevers..	3	..	·8	..	6·3	·13
Paroxysmal „	43	..	11·0	..	27·8	·38
Continued „	373	7	95·5	1·79	151·4	3·92
Dysentery, Diarrhœa, and Cholera ..	94	..	24·1	..	40·8	·05
Sorethroat and Influenza	91	..	23·3	..	24·5	..
Ophthalmia	176	..	45·0	..	41·7	..
Rheumatism	91	..	23·3	..	27·1	·13

It will be seen that the reduction in the amount of this class of diseases has taken place in paroxysmal and continued fevers, and in bowel complaints.

Continued fevers have been one-third under the average of the four preceding years. Their prevalence appears still to have been due, in a great degree, to the unsanitary condition of Fort Neuf, the 2nd Battalion 6th Regiment, which occupied that quarter, having furnished more than twice as many cases as any other corps in the Command.

Ophthalmia was slightly in excess of the average. The 1st and 2nd Battalions of the 9th Regiment had the largest number of admissions, but no reason is assigned for its greater prevalence in them than in the other corps.

ACCIDENTS.—The fatal case in this class was that of an Artilleryman who, during a sham fight at Vido, ran before a gun, and was blown from the parapet into the ditch, a height of thirty-two feet.

The other classes of diseases do not seem to require special observation.

The admissions into hospital, and deaths in the different islands, were as follows :—

	Average Strength.	Admissions into Hospital.	Total Deaths	Annual Ratio per 1,000. Admitted.	Annual Ratio per 1,000. Died.
Corfu and Vido	2,869	1,976	24	689	8·36
Paxo	32	14	..	437	..
Santa Maura	135	91	..	674	..
Cephalonia	468	303	6	647	12·82
Zante	295	221	..	943	..
Ithaca	63	91	..	1,444	..
Cerigo	32	9	..	281	..

The admissions in Ithaca have been high in proportion to the strength. This was caused chiefly by fever, which prevailed in the month of August, and was attributed to the imperfect drainage of the barracks. On this being remedied the disease ceased. The cases were all mild, and yielded readily to treatment.

The admissions and deaths by the different classes of diseases in the three principal islands is shown in the following Table :—

Ionian Islands.

	Stations	Corfu.				Cephalonia.				Zante.			
	Strength	2,938.				484.				298.			
				Annual Ratio per 1,000.				Annual Ratio per 1,000.				Annual Ratio per 1,000.	
Order.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.												
1	Miasmatic Diseases ..	534	7	186·1	2·44	72	1	153·8	2·14	65	..	220·3	..
2	Enthetic „ ..	361	..	125·8	..	37	..	79·1	..	52	..	176·3	..
3	Dietic „ ..	60	..	20·9	..	6	..	12·8	..	2	..	6·8	..
4	Parasitic „	9	..	3·1	..	1	..	2·1	..	1	..	3·4	..
	Class II.												
1	Diathetic Diseases ..	7	2	2·4	·69	..	..	..	..	..	..	..	..
2	Tubercular „ ..	25	5	8·7	1·74	5	1	10·7	2·14	..	..	..	..
	Class III. Diseases of the—												
1	Nervous System ..	150	1	52·3	·35	43	1	91·9	2·14	4	..	13·6	..
2	Circulatory „ ..	14	1	4·9	·35	7	2	15·0	4·28	3	..	10·2	..
3	Respiratory „ ..	84	3	29·3	1·04	11	1	23·5	2·14	5	..	16·9	..
4	Digestive „ ..	112	4	39·0	1·39	18	..	38·5	..	5	..	16·9	..
5	Urinary „ ..	10	..	3·5	..	1	..	2·1	..	4	..	13·6	..
6	Reproductive „ ..	20	..	7·0	..	1	..	2·1	..	2	..	6·8	..
7	Locomotive „ ..	4	..	1·4	..	..	..	..	..	..	..	..	..
8	Integumentary „ ..	311	..	108·4	.	51	..	109 0	..	51	..	172·9	..
	Class IV.												
4	Diseases of Nutrition ..	19	..	6·6	..	3	..	6·4	..	..	..	..	..
	Class V.												
1	Accidents	249	1	86·8	·35	46	..	98·3	..	27	..	91·5	..
6	Corporal Punishment.	5	..	1·7	..	1	..	2·1	..	..	..	..	..
	Diseases not specified.	2	..	·7	..	..	..	..	..	..	..	..	..
	Total	1976	24	688·6	8·35	303	6	647·4	12·84	221		749·2	..

There has been a marked reduction in the prevalence of miasmatic diseases in all these islands compared with the amount in 1862, and a considerable increase in the admissions from intemperance, the only disease in the dietic class. Venereal has been more common in Corfu, but there has been no increase in the other islands. Diseases of the digestive system have been extremely low in Zante compared with the preceding year.

Section II.

On the Extent of Invaliding among the Troops serving in the Mediterranean.

Mediterranean. During the year 1863, there were 328 invalids sent to England from the Mediterranean Commands, being in the ratio of 21·85 per 1,000 of the strength. Of these 33 were sent home from Gibraltar for discharge, and 91 for change of climate; 78 from Malta for discharge, and 56 for change; and 36 from the Ionian Islands for discharge, and 34 for change.

The following Table, compiled from Abstract No. X. of Appendix, shows the principal classes of diseases on account of which they were sent home:—

Mediterranean.

	Gibraltar.		Malta.		Ionian Islands.	
	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.
Paroxysmal Fevers	..	1	..	..	..	..
Continued "	..	5	..	..	..	2
Dysentery and Diarrhœa	..	1	..	2	..	..
Ophthalmia	..	4	10	27	..	..
Rheumatism	..	2	3	7	1	2
Venereal Diseases	..	7	2	1	3	1
Parasitic "	..	1	..	..	..	..
Diathetic "	..	..	1	..	..	1
Tubercular "	3	24	20	3	8	3
Diseases of the—						
Nervous System..	12	9	11	2	6	1
Circulatory "	5	9	10	..	11	3
Respiratory "	1	13	2	5	2	12
Digestive "	3	7	5	2	..	2
Urinary "	1	2	..	1	..	1
Reproductive "	..	1	..	..	..	..
Locomotive "	4	..	3	1	1	1
Integumentary "	..	1	4	2	1	3
Diseases of Nutrition	2	2	4	1	..	..
Accidents and Violence	2	2	3	2	3	2
Total	33	91	78	56	36	34
Ratio per 1,000 of Mean Strength 1863	6·2	17·0	13·5	9·7	9·2	8·7
Ratio per 1,000 of Mean Strength 1861–2	8·6	21·9	8·6	7·7	14·4	6·7

The proportion sent home from Malta has been rather above the average of the two preceding years. The reduction in that from the Ionian Islands may, perhaps, have arisen from the probability of the troops being immediately withdrawn.

Ophthalmia still continues the principal cause of invaliding from Malta. A considerable number of men have been sent home both from Gibraltar and Malta on account of tubercular diseases, and from Malta and the Ionian Islands for those of the circulatory system.

The number finally discharged the service at the Invalid Depôt, and the causes of disability, are shown in the following Table:—

Mediterranean.

Invalids from			Gibraltar.	Malta.	Ionian Islands.	Total Mediterranean Commands.
Paroxysmal Fevers	..	..	2	1	..	3
Continued „	..	..	2	..	..	2
Diarrhœa	..	..	1	2	..	3
Ophthalmia.. ..	..	..	5	39	1	45
Rheumatism ..	..	..	5	4	..	9
Venereal Diseases ..	..	..	9	3	3	15
Tubercular „ ..	..	..	24	25	4	53
Diseases of the—						
Nervous System	..	..	9	9	6	24
Circulatory „	..	..	13	8	11	32
Respiratory „	..	..	10	7	1	18
Digestive „	..	..	8	6	4	18
Urinary „	..	..	..	..	1	1
Locomotive „	..	..	1	3	..	4
Integumentary „	..	..	2	4	1	7
Diseases of Nutrition	..	..	2	3	..	5
Accidents and Violence	..	..	4	5	1	10
Total	..	..	97	119	33	249
Ratio per 1,000 of Mean Strength	1863 ..	..	18·1	20·7	8·4	16·6
	1859–62	..	14·2	7·8	8·2	10·2

The proportion finally discharged the service in 1863 of men invalided from Malta has been greatly above the average, the excess being due to ophthalmia. The number from Gibraltar and Malta discharged on account of tubercular diseases has amounted to nearly one-fourth of the whole, and the number on account of diseases of the circulatory system has been high from all three Commands.

Section III.

Mean Daily Sick.

The mean daily sick, the average sick time to each soldier serving, and the average duration of the cases in hospital during 1863, were as follows :—

		Gibraltar.	Malta, exclusive of Royal Malta Fencibles.	Ionian Islands.	United Kingdom. Infantry Regiments. Average of four years, 1860–63.
Average Strength in 1863 ..		5,347	5,757	3,906	
Average constantly sick in 1863..		218	246	143	
Ratio per 1,000 constantly sick	1863 ..	40·77	42·73	36·61	45·28
	1859–62..	44·72	46·66	38·72	
		days	days	days	days
Average sick time to each Soldier	1863 ..	14·88	15·59	13·36	16·53
	1859–62..	16·32	17·03	14·13	
Average duration of the cases of disease	1863 ..	16·96	23·43	19·53	19·49
	1859–62..	18·26	18·79	17·67	

Mediterranean.

There has been a reduction in all these particulars in these Commands, except in the average duration of cases at Malta and in the Ionian Islands. The increase at Malta, amounting to nearly five days upon the average of the four preceding, and three days upon that of 1862, has been probably due to the prevalence of ophthalmia, as the average duration of the cases of that disease during the year amounted to 39·69 days.

SECTION IV.

On the Influence of Age on the Mortality.

The numbers serving in the Mediterranean Commands, classified according to ages, and the deaths in each quinquennial period of life, are stated in Abstract No. XI. of Appendix, from which the following results for 1863 have been obtained :—

		Ratio of Deaths per 1,000 of Strength at each Period of Life					
		Under 20.	20-24.	25-29.	30-34.	35-39.	40 and upwards.
Mediterranean Commands	1863	4·64	3·67	6·65	9·83	26·97	22·99
	1859-62	6·85	8·00	12·34	13·03	12·27	24·29

This shows a rate of mortality below the average at the earlier ages. The numbers under observation above 34 are too few to justify any deductions.

III.—ON THE HEALTH OF THE TROOPS SERVING IN BRITISH AMERICA.

Section I.

Sickness and Mortality.

I. BERMUDA.

Bermuda.

During 1863 the troops employed in this Command consisted of two batteries of the 15th Brigade Royal Artillery, two companies of the Royal Engineers, and the 39th Regiment. The average strength was 1,172 non-commissioned officers and men, among whom there were 802 admissions into hospital, 10 deaths within the limits of the Command, one of which occurred out of hospital, and three deaths among invailds. These numbers give the proportion of 684 admissions and 11·10 deaths per 1,000 of mean strength, both being under the ratio in 1862.

The diseases by which the admissions and deaths were occasioned are stated in Abstract No. XII. of Appendix, from which, and previous reports, the following Table has been prepared :—

Bermuda.

Orders.	Diseases.	Average Strength, 1,172.				Annual ratio per 1,000.			
		Admitted into Hospital.	Died.			1863.		1859—62.	
			At Bermuda.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases	311	1	..	1	265·4	·85	188·6	·91
2	Enthetic „	64	..	..	..	54·6	..	61·6	..
3	Dietic „	54	1	..	1	46·1	·85	25·6	·23
4	Parasitic „	3	..	..	..	2·6	..	5·8	..
	Class II.								
1	Diathetic Diseases	8	..	..	..	6·8	..	1·6	·23
2	Tubercular „	20	1	3	4	17·1	3·42	9·0	2·04
	Class III. Diseases of the—								
1	Nervous System	44	2	..	2	37·5	1·71	22·8	2·94
2	Circulatory „	3	2	..	2	2·6	1·71	5·2	·91
3	Respiratory „	47	3	..	3	40·1	2·56	53·7	..
4	Digestive „	45	..	..	..	38·4	..	61·8	1·13
5	Urinary „	4	..	..	..	3·4	..	·9	..
6	Reproductive „	6	..	..	..	5·1	..	9·7	..
7	Locomotive „	1	..	..	..	·8	..	3·4	..
8	Integumentary „	80	..	..	..	68·3	..	103·3	..
	Class IV.								
4	Diseases of Nutrition ..	1	..	..	..	·8	..	2·5	..
	Class V.								
1	Accidents	109	..	..	..	93·0	..	77·7	2·04
4	Suicide	..	..	..	..	..	..	..	1·36
6	Corporal Punishment ..	2	..	..	..	1·7	..	1·1	..
	Diseases not specified ..	..	..	..	..	..	..	2·5	..
	No appreciable disease ..	..	..	..	..	..	..	·7	..
	Total.. ..	802	10	3	13	684·3	11·10	637·5	11·79

The admissions have been above the average of the four preceding years, the increase being chiefly in miasmatic and dietic diseases, in those of the nervous system, and in accidents, while there has been a decrease in diseases of the respiratory, digestive, and integumentary systems :—

MIASMATIC DISEASES.—The prevalence of the principal groups of diseases composing this class has been as follows :—

Diseases.	Admitted.	Died.	Ratio per 1,000 of Strength.			
			1863.		1859-62.	
			Admitted.	Died.	Admitted.	Died.
Paroxysmal Fevers..	3	..	2·6	..	1·6	..
Continued „	180	..	153·6	..	55·3	·23
Dysentery, Diarrhœa, and Cholera	45	1	38·4	·85	52·6	·68
Sorethroat and Influenza ..	27	..	23·0	..	13·2	..
Ophthalmia..	23	..	19·6	..	36·5	..
Rheumatism	31	..	26·5	..	24·0	..

This shows a marked increase in 1863 of continued fevers, and a slight increase of sorethroat and influenza, while there has been a decrease in diarrhœa and ophthalmia.

Continued Fevers were very prevalent during the latter part of the year among the civil population of St. George's and Hamilton. The epidemic extended to the troops, and during the last quarter of the year 74 cases occurred in the Royal Artillery and Engineers, in a strength of about 420 men, and 87 in the 39th Regiment, about 740 strong. None of the cases died. The disease is described as "continued fever of a mild form running to a speedy termination, but leaving behind it a degree of weakness and lassitude quite disproportioned to the acute symptoms." It is stated to have been confined to the white population.

DIETIC DISEASES have been greatly in excess of the average. The admissions were all under the head of Intemperance; 22 of them occurred in the Ordnance Corps, and 32 in the 39th Regiment, being respectively in the proportion of 54 and 42 per 1,000 of mean strength. *Delirium Tremens* also caused thrice as many admissions as in 1862. The Principal Medical Officer attributes much of this to the great increase of low drinking dens consequent on the accession to the population of Bermuda of strangers engaged in the blockade-running business.

DISEASES OF THE INTEGUMENTARY SYSTEM were found in 1862 to have greatly exceeded the average, owing to the prevalence of boils and ulcers, for which no reason could be assigned. In 1863 these affections had fallen even below the previous average.

ACCIDENTS.—The increase in the admissions by this class may be explained by the increase already shown to have occurred in the amount of intemperance. They did not prove fatal in any case.

II. NOVA SCOTIA AND NEW BRUNSWICK.

Nova Scotia and New Brunswick.

The troops employed in this Command continued without change during 1863. The average strength was 3,096; the admissions into hospital were 1,736; the deaths 25, of which 14 occurred in and 9 out of hospital, and 2 among invalids at the Invalid Depôt. The ratio of admissions, therefore, was 561, and of deaths 8·06 per 1,000 of mean strength, both a little below the proportion in 1862, in the permanent force.

The admissions and deaths in each corps are shown in the following Table:—

Nova Scotia and New Brunswick.

Corps.	Average Annual Strength.	Admitted into Hospital.	Died.				Ratio per 1,000 of Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery.. ..	527	391	1	1	..	2	742	3·80
„ Engineers ..	168	114	..	..	..	..	679	..
1st Batt. 15th Regiment	764	437	3	4	..	7	572	9·16
2nd „ 16th „	810	480	6	3	1	10	593	12·34
2nd „ 17th „	823	314	3	1	1	5	382	6·08

The other death was that of a sergeant of the Commissariat Corps.

The influence of the different classes of diseases in producing sickness and mortality in this Command is shown in the following Table. The details for 1863 will be found in Abstract No. XII. of Appendix:—

Orders.	Diseases.	1863.						1859–62.	
		Mean Strength, 3,096.				Annual Ratio per 1,000 of Strength.		Annual Ratio per 1,000 of Strength.	
		Admissions.	Deaths.			Admitted.	Died.	Admitted.	Died.
			In Nova Scotia.	Of Invalids.	Total.				
	Class I.								
1	Miasmatic Diseases ..	401	1	..	1	129·5	·32	119·9	·69
2	Enthetic „ ..	396	..	..	..	127·9	..	130·6	..
3	Dietic „ ..	37	2	..	2	12·0	·64	12·2	·57
4	Parasitic „ ..	60	..	..	..	19·4	..	9·6	..
	Class II.								
1	Diathetic Diseases ..	..	..	..	..	..	..	1·2	·23
2	Tubercular „ ..	16	..	2	2	5·2	·64	13·8	2·29
	Class III. Diseases of the—								
1	Nervous System ..	29	3	..	3	9·4	·97	13·6	·46
2	Circulatory „ ..	7	3	..	3	2·3	·97	3·4	·91
3	Respiratory „ ..	137	3	..	3	44·2	·97	65·1	1·03
4	Digestive „ ..	102	2	..	2	32·9	·64	31·6	·34
5	Urinary „ ..	2	..	..	..	·6	..	2·8	..
6	Reproductive „ ..	19	..	..	..	6·1	..	2·6	..
7	Locomotive „ ..	7	..	..	..	2·3	..	2·4	..
8	Integumentary „ ..	281	..	..	..	90·8	..	73·4	..
	Class IV.								
4	Diseases of Nutrition ..	2	..	..	..	·6	..	·5	..
	Class V.								
1	Accidents	232	9	..	9	74·9	2·91	94·9	·69
3	Homicide	..	..	..	..	..	..	..	·11
4	Suicide	..	..	..	..	..	..	..	·11
6	Corporal Punishment ..	8	..	..	..	2·6	..	1·0	..
	No appreciable disease..	..	..	..	..	..	..	·1	..
	Diseases not stated ..	..	..	..	..	..	..	2·4	..
	Total	1,736	23	2	25	560·7	8·06	581·1	7·43

Nova Scotia and New Brunswick.

The admissions have been 20 below and the deaths 0·63 above the average of the four preceding years. The principal difference has been an increase in parasitic diseases and those of the integumentary system, and a decrease in tubercular diseases and those of the respiratory system, and in accidents. To the latter class, also, the higher rate of mortality is due.

Miasmatic Diseases, when subdivided into groups, give the following results:—

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859-62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	1	..	·3	..	1·5	·11
Paroxysmal „	4	..	1·3	..	1·5	..
Continued „	28	..	9·0	..	12·7	·46
Dysentery, Diarrhœa, and Cholera	24	..	7·8	..	15·9	..
Sorethroat and Influenza	169	..	54·6	..	33·7	..
Ophthalmia	44	..	14·2	..	15·5	..
Rheumatism	92	..	29·7	..	31·0	..

There has been an increase in the admissions by *sorethroat and influenza*, and a slight decrease in those by continued fevers. During the early part of the year *eruptive fevers* prevailed to a considerable extent among the civil population, but did not affect the troops.

Diseases of the Respiratory System have been under the previous average to the same extent that sorethroat and influenza have exceeded it. *Bronchitis* is the disease in which the reduction, and influenza that in which the increase occurred.

Accidents.—The nine deaths under this class were all by drowning. Four were caused by the upsetting of a boat; three men were found drowned, the circumstances under which the casualties occurred not being known, and two were drowned while bathing. It is to be regretted that instruction in swimming is not included in the training of the soldier.

III. Canada.

Canada.

The average strength of the troops employed in Canada during 1863 was 10,764; the admissions into hospital were 7,318; the deaths amounted to 103, of which 62 occurred in and 34 out of hospital, and 7 among the invalids. These numbers give the proportion of 680 admissions, and 9·57 deaths per 1,000 of mean strength.

The admissions and deaths in each corps have been as follows:—

Canada.

	Annual Average Strength.	Admitted into Hospital.	Deaths.				Annual ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery ..	1,804	1,530	12	5	3	20	848	11·09
Military Train ..	291	271	3	1	..	4	931	13·75
1st Batt., Grenadier Guards	817	565	3	1	1	5	692	6·12
1st Batt., Scots Fusilier Guards ..	820	480	4	..	..	4	585	4·88
1st Batt., 16th Regt...	726	641	5	3	1	9	883	12·40
1st Batt., 17th Regt..	735	412	2	4	..	6	561	8·16
30th Regiment ..	751	436	4	2	..	6	581	7·99
47th Regiment ..	727	511	2	1	..	3	703	3·94
4th Batt., 60th Regt.	794	467	4	3	..	7	588	8·82
62nd Regiment ..	758	469	6	..	..	6	619	7·92
63rd Regiment ..	727	467	7	1	1	9	642	12·38
1st Batt., Rifle Brig..	757	358	1	3	1	5	473	6·60
Royal Canadian Rifles.	988	487	8	8	..	16	493	16·19

Of the other three deaths, one was a sergeant of the Army Hospital Corps and two were corporals of the Commissariat Staff Corps.

The diseases by which the admissions and deaths in 1863 were occasioned are stated in Abstract No. XII. of Appendix. The following Table shows the influence of the various classes of diseases in it and the four preceding years:—

Canada.

Orders.	Diseases.	Strength, 10,764.				Annual Ratio per 1,000.			
			Deaths.			1863.		1859-62.	
		Admissions.	In Canada.	Of Invalids.	Total.	Admissions.	Deaths.	Admissions.	Deaths.
	Class I.								
1	Miasmatic Diseases ..	1,308	9	..	9	121·4	·84	134·7	1·09
2	Enthetic „	2,060	..	..	..	191·4	..	132·5	·05
3	Dietic „	185	2	..	2	17·2	·18	19·5	·16
4	Parasitic „	45	..	..	..	4·2	..	6·6	..
	Class II.								
1	Diathetic Diseases	25	..	..	..	2·3	..	1·8	..
2	Tubercular „	90	14	3	17	8·4	1·58	7·2	1·41
	Class III. Diseases of the								
1	Nervous System	158	15	2	17	14·7	1·58	16·8	1·09
2	Circulatory „	38	13	1	14	3·5	1·30	3·3	·73
3	Respiratory „	745	10	..	10	69·2	·93	66·2	1·46
4	Digestive „	303	4	1	5	28·2	·46	38·1	·42
5	Urinary „	20	3	..	3	1·9	·28	2·4	·16
6	Reproductive „	76	..	..	..	7·1	..	5·8	..
7	Locomotive „	47	..	..	..	4·4	..	3·0	..
8	Integumentary „	1,129	..	..	..	104·9	..	85·1	·10
	Class IV.								
4	Diseases of Nutrition ..	9	..	..	..	·8	..	·7	..
	Class V.								
1	Accidents	1,058	23	..	23	98·3	2·14	97·0	1·88
3	Homicide	..	..	..	..	..	..	·1	·21
4	Suicide	1	3	..	3	·1	·28	·1	·26
5	Execution	..	..	..	..	..	..	..	·05
6	Corporal Punishment ..	12	..	..	..	1·1	..	·9	..
	Diseases not specified ..	9	..	..	..	·8	..	·8	..
	Total	7,318	96	7	103	679·9	9·57	622·1	9·07

This Table shows the proportion both of admissions and deaths to have been higher than the average of the four preceding years. The excess of the former has been chiefly in venereal and diseases of the integumentary system, and of the latter in diseases of the nervous and circulatory system, and in violent deaths.

MIASMATIC DISEASES have been under the average. They furnish the following results when subdivided into groups:—

Canada.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859-62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	25	..	2·3	..	2·7	·05
Paroxysmal „	63	..	5·8	..	5·7	·10
Continued „	177	6	16·4	·57	20·1	·63
Dysentery, Diarrhœa, and Cholera ..	204	1	18·9	·09	28·5	..
Sorethroat and Influenza	350	..	32·5	..	25·7	..
Ophthalmia	137	..	12·7	..	15·9	..
Rheumatism	243	..	22·6	..	27·7	·10

The reduction in these diseases appears to have been distributed over the various groups, with the exception of sorethroat and influenza, which were in excess of the previous average.

ENTHETIC DISEASES have been considerably in excess of the average. The increase has been most marked in syphilis, but has not been confined to it, the cases of bubo and gonorrhœa having also been much more numerous than in 1862.

DISEASES OF THE NERVOUS SYSTEM were the cause of 17 deaths, and of these 9 were from *Delirium Tremens.* In addition to these there were two the direct result of intemperance (*Ebriositas*).

DISEASES OF THE CIRCULATORY SYSTEM furnished 14 deaths, and there is too much reason to believe that a large proportion of these also may be fairly traced to the same vice.

VIOLENCE.—The deaths from accidents were above the average. Of 23 in this class, 14 were by drowning. There were only three deaths by suicide, being exactly in the proportion of the average of the four preceding years.

IV.—NEWFOUNDLAND.

Newfoundland.

During 1863 the troops employed in Newfoundland consisted of a battery of the 10th Brigade Royal Artillery, and two companies of the Royal Canadian Rifles. The average strength of the Force was 318; the admissions into hospital amounted to 103; and the only death which occurred was that of an invalid on his passage to England. The former, therefore, were in the ratio of 324, and the latter was 3·15 per 1,000 of the strength.

The following Table shows the admissions and deaths by the different classes of diseases. The usual details for 1863 will be found in Abstract No. XII. of Appendix:—

Newfoundland.

Orders.	Diseases.	Strength, 318.				Annual Ratio per 1,000.					
			Died.			1863.		1859-62.		Nova Scotia, &c. 1863.	
		Admissions.	In Newfoundland.	Of Invalids.	Total.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.
	Class I.										
1	Miasmatic Diseases ..	24	..	..	..	75·6	..	376·3	..	129·5	·32
2	Enthetic ,, ..	9	..	..	..	28·3	..	43·7	..	127·9	..
3	Dietic ,, ..	8	..	..	..	25·2	..	35·8	1·12	12·0	·64
4	Parasitic ,, ..	1	..	..	..	3·1	..	5·6	..	19·4	..
	Class II.										
1	Diathetic Diseases ..	1	..	..	..	3·1	..	6·7	..	..	..
2	Tubercular ,, ..	1	..	1	1	3·1	3·15	11·2	1·12	5·2	·64
	Class III. Diseases of the—										
1	Nervous System ..	2	..	..	..	6·3	..	53·8	2·24	9·4	·97
2	Circulatory ,, ..	1	..	..	..	3·1	..	25·8	..	2·3	·97
3	Respiratory ,, ..	8	..	..	..	25·2	..	123·2	2·24	44·2	·97
4	Digestive ,, ..	8	..	..	..	25·2	..	58·2	..	82·9	·64
5	Urinary ,, ..	1	..	..	..	3·1	..	2·2	..	·6	..
6	Reproductive ,, ..	..	..	..	..	..	..	4·5	..	6·1	..
7	Locomotive ,, ..	2	..	..	..	6·8	..	11·2	..	2·3	..
8	Integumentary ,, ..	6	..	..	..	18·9	..	68·3	..	90·8	..
	Class IV.										
4	Diseases of Nutrition.	..	..	..	..	..	..	..	..	·6	..
	Class V.										
1	Accidents	30	..	..	..	94·3	..	144·5	..	74·9	2·91
4	Suicide	..	..	..	..	..	..	..	..	..	..
6	Corporal Punishment	1	..	..	..	3·1	..	3·4	..	2·6	..
	Diseases not stated ..	..	..	..	..	..	..	5·6	..	..	..
	Total	103	..	1	1	323·9	3·15	980 0	6·72	560·7	8·06

The admissions have amounted to scarcely one-third of the average of the four preceding years. The reduction has been chiefly in miasmatic diseases, particularly sorethroat and influenza and rheumatism. It has also been very marked in most of the classes of local diseases. This great change may be attributed to the reduction of the Newfoundland Companies, consisting of old soldiers whose habits were reported to be anything but temperate, and the substitution of a garrison composed of men of the Royal Artillery and Canadian Rifle Corps.

V. British Columbia.

British Columbia.

In November 1863, the detachment of Royal Engineers which constituted the Force in this Colony, was withdrawn. Of 128 men, 113 took their discharge to remain as settlers, and 15 returned to England. During the ten months they were in British Columbia, they furnished only 28 admissions into hospital, ten of which were on account of injuries received while at work, and none of any importance. No deaths occurred among them.

This station has been occupied by troops four years and a-half. On the average of that period the admissions into hospital have been 631, and the

British Columbia. deaths 12·16 per 1,000 of the strength. But of the latter, which amounted to eight, only two were the result of disease. The deaths, therefore, in the proportion of 9·12 per 1,000 of the strength from accidents, and only 3·04 per 1,000 from desease.

SECTION II.

On the Extent of Invaliding.

The number of men sent home as invalids from the North American Commands in 1863 was 245. The diseases for which they were invalided are detailed in Abstract No. XIII. of Appendix, for which the following Table has been framed:—

Invalids sent Home.	Bermuda.		Nova Scotia and New Brunswick.		Canada.		New-foundland.	
	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.	For Discharge.	For change of Climate.
Miasmatic Diseases	..	5	3	4	2	5	..	..
Enthetic "	..	2	1	1	5	13	..	4
Dietic "	..	1	..	..	..	..	..	..
Diathetic "	..	1	..	..	..	3	..	..
Tubercular "	2	6	2	3	28	4	..	..
Diseases of the—								
Nervous System	4	4	6	1	24	2	..	..
Circulatory "	2	3	3	..	8	2	..	..
Respiratory "	..	..	3	7	7	10	..	1
Digestive "	..	2	2	1	11	5	..	..
Urinary "	..	..	..	..	3	1	..	..
Reproductive "	..	..	..	1	..	..	..	..
Locomotive "	..	..	..	2	1	7	..	..
Integumentary "	..	2	2	2	3	2	..	..
Diseases of Nutrition	..	..	1	..	1	..	..	..
Accidents, Violence, &c. ..	2	..	4	..	8	..	..	..
Total	10	26	27	23	101	54	..	5
Annual ratio per 1,000 of Strength { 1863 ...	8·69	22·19	8·33	7·11	9·38	5·02	..	1·57
Annual ratio per 1,000 of Strength { 1860–2 .	4·80	9·29	12·53	7·77	8·78	5·37	5·85	7·31

The proportion sent home from Bermuda has been above, from Nova Scotia under, and from Canada almost exactly the average. Tubercular diseases and those of the nervous system have been the chief causes, but in Canada venereal has also given rise to a considerable amount of invaliding.

During the year there were finally discharged the service as invalids 24 men from Bermuda, and 146 from Canada, Nova Scotia, and Newfoundland; and there were also 23 invalids finally discharged in Canada. The disabilities assigned were as follows:—

British America.

Invalids from	Bermuda.	Canada, Nova Scotia, and Newfoundland.	
		Discharged in England.	Discharged in Canada.
Miasmatic Diseases	5	14	1
Enthetic "	2	15	1
Tubercular "	7	31	4
Diseases of the—			
Nervous System	2	19	5
Circulatory "	4	14	3
Respiratory "	1	14	..
Digestive "	..	11	1
Urinary "	1	3	..
Reproductive "	..	2	..
Locomotive "	..	9	2
Integumentary "	..	5	1
Diseases of Nutrition	..	2	1
Accidents and Violence	2	7	4
Total	24	146	23
Ratio per 1,000 of Mean Strength 1863	20·48	10·30	1·6
Ratio per 1,000 of Mean Strength 1859–62	7·25	10·97	1·0

The number finally discharged the service of invalids from Bermuda has been nearly thrice the average of the four preceding years. Of those from Canada and Nova Scotia the proportion very closely approximates the previous average. Tubercular diseases and those of the nervous system have been the most prominent causes of disability. Venereal has also contributed a considerable number.

Section III.

Mean Daily Sick.

The mean daily sick throughout the year was in Bermuda 31, Nova Scotia 77, Canada 339, and Newfoundland 9. The following Table shows the usual deductions on this head:—

	Bermuda.		Nova Scotia and New Brunswick.		Canada.		Newfoundland.	
	1863.	1859-62.	1863.	1859-62.	1863.	1859-62.	1863.	1859-62.
Ratio per 1,000 of strength constantly sick ..	26·51	32·19	24·87	26·07	31·49	28·16	28·30	36·95
Average sick time to each soldier	days 9·65	days 11·75	days 9·08	days 9·52	days 11·15	days 10·28	days 10·33	days 13·49
Average duration of the cases of disease	14·11	18·43	16·19	16·37	16·91	16·52	31·89	13·77

This shows a slight reduction in the mean daily sick, except in Canada, where it has been three per 1,000 above the average. The average sick-time to each

British America.

soldier presents a similar reduction. The duration of the cases has been less in Bermuda and Nova Scotia, slightly higher in Canada, and above twice the previous average in Newfoundland. This great increase must depend on the men not reporting themselves when the sickness is of a trivial character, and is probably the result of a large proportion of the detachment of the Canadian Rifles being married.

Section IV.

Influence of Age on the Mortality.

The following Table, compiled from Abstract No. XIV. of Appendix, shows the proportion of deaths in every 1,000 men at each quinquennial period of life:—

Stations.	Ratio of Deaths per 1,000 of Strength at each age.					
	Under 20.	20–24.	25–29.	30–34.	35–39.	40 and upwards.
Bermuda	..	7·13	12·47	9·97	35·71	..
Canada, Nova Scotia, New Brunswick, and Newfoundland ..	·81	7·18	8·60	11·13	18·75	34·70
Total 1863 ..	·80	7·17	9·00	11·01	19·86	34·05
Total 1859–62 ..	2·33	6·42	10·67	10·69	15·22	10·95

These results do not differ from the average more than may be attributed to the fluctuations depending upon limited numbers, and between the ages of 20 and 35 closely approximate the ratios for the infantry serving in the United Kingdom.

IV.—ON THE HEALTH OF THE TROOPS SERVING IN THE WEST INDIES.

Section I.

Sickness and Mortality.

I. Windward and Leeward Command.

I. White Troops.

Windward and Leeward Command.

The force employed in this Command during the year consisted of Royal Artillery, the 1st Battalion 21st Regiment, and a detachment from Jamaica of the 1st Battalion 14th Regiment. In the beginning of the year there were two batteries of Royal Artillery at Barbadoes, but early in February one of them embarked for England. The detachment of the 14th Regiment consisted of three companies stationed at Trinidad, and one at St. Lucia. The latter was withdrawn on the 1st of November.

The average strength throughout the year was 1,210; the admissions into hospital were 1,214; the deaths in hospital 10, out of hospital 1. No deaths occured among the invalids. These numbers give the ratio of 1,003 admissions, and 9·09 deaths per 1,000 of mean strength.

Windward and Leeward Command.

The diseases by which the admissions into hospital and deaths in 1863 were caused are detailed in Abstract No. XV. of Appendix. The following Table shows the influence of the various classes of diseases on the sickness and mortality.

Orders.	Diseases.	1863.						1859–62.	
		Strength, 1,210.				Ratio per 1,000.		Ratio per 1,000.	
			Died.						
		Admitted.	In the Command.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases. ..	439	2	..	2	354·6	1·65	535·7	4·45
2	Enthetic „	195	..	..	..	161·2	..	104·0	..
3	Dietic „	34	..	..	..	28·1	..	26·1	·20
4	Parasitic „	9	..	..	..	7·4	..	3·2	..
	Class II.								
1	Diathetic Diseases . ..	10	..	..	..	8·3	..	6·3	..
2	Tubercular „	10	2	..	2	8·3	1·65	10·3	1·21
	Class III.								
	Diseases of the—								
1	Nervous System ..	54	2	..	2	44·6	1·65	32·9	2·22
2	Circulatory „	8	..	..	..	6·6	..	3·8	·81
3	Respiratory „	54	1	..	1	44·6	·83	31·9	·40
4	Digestive „	58	1	..	1	47·9	·83	75·2	·61
5	Urinary „	..	..	..	..	..	..	·6	..
6	Reproductive „	36	..	..	..	29·8	..	13·1	..
7	Locomotive „	4	..	..	..	3·3	..	4·6	..
8	Integumentary „	186	..	..	..	153·7	..	160·4	..
	Class IV.								
4	Diseases of Nutrition ..	..	..	..	..	..	..	1·6	..
	Class V.								
1	Accidents	124	1	..	1	102·5	·83	95·4	·61
4	Suicide	2	2	..	2	1·6	1·65	·2	·40
6	Corporal Punishment ..	1	..	..	..	·8	..	2·4	..
	Diseases not stated . ..	..	..	..	..	..	..	4·4	..
	Total	1,214	11	..	11	1003·3	9·09	1112·1	10·91

This shows the admissions and deaths in 1863 to have been under the average of the four preceding years, the difference being chiefly in miasmatic diseases, and in the admissions by those of the digestive system. Venereal diseases have been considerably above the average, and there has been an increase also in those of the nervous and respiratory systems.

Miasmatic Diseases have been one-third lower than the previous average. The admissions by the principal groups comprised in this class were as follows:—

Windward and Leeward Command.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859–62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	1	..	·8	..	2·2	..
Paroxysmal „	237	2	195·9	1·74	282·0	3·84
Continued „	9	..	7·4	..	39·2	·20
Dysentery, Diarrhœa, & Cholera	63	..	52·1	..	46·0	..
Sorethroat and Influenza ..	16	..	13·2	..	10·1	·20
Ophthalmia	79	..	65·8	..	116·5	..
Rheumatism	23	..	19·0	..	26·3	..

This shows the decrease to have taken place in paroxysmal and continued fevers and in ophthalmia. The admissions from intermittent fever are still very high, but they occurred, for the most part, among the men of the 21st Regiment, who had contracted a liability to that form of disease while encamped at Belfield in 1861, during the prevalence of yellow fever in Demerara.

No cases of yellow fever occurred during the year. The white troops in Barbadoes, who had been removed to Gun Hill on the outbreak of the epidemic in 1862, returned to St. Ann's in January and February 1863, after it had ceased among the civil population.

Enthetic Diseases.—There has been a great increase in the prevalence of venereal, but no special reason is assigned for this by the medical officers.

Accidents and Violence. — A death occurred at St. Lucia from the accidental explosion of the cartridge while the evening gun was being loaded. The suicidal death was that of a man of the 21st Regiment, who discharged the contents of his rifle through his head in the barracks at St. Ann's, Barbadoes.

The admissions into hospital and deaths at each of the subordinate stations, are detailed in Abstract No. XV. of Appendix, from which the following Table has been framed.

Windward and Leeward Command.

Orders.	Diseases.	Ratio per 1,000 of Mean Strength in 1863.							
		Barbadoes.		St. Lucia.		Trinidad.		British Guiana.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	346·4	2·60	272·7	..	350·8	4·03	444·4	..
2	Enthetic „ ..	224·0	..	109·1	..	40·3	..	29·6	..
3	Dietic „ ..	23·4	..	54·5	..	44·3	..	14·8	..
4	Parasitic „ ..	6·5	..	18·2	..	12·1	..	..	..
	Class II.								
1	Diathetic Diseases ..	5·2	..	18·2	..	12·1	..	14·8	..
2	Tubercular „ ..	7·8	..	..	..	8·1	8·06	14·8	..
	Class III. Diseases of the—								
1	Nervous System ..	48·2	1·30	36·4	..	52·4	4·03	14·8	..
2	Circulatory „ ..	9·1	1·30	..	..	4·0	..	..	..
3	Respiratory „ ..	58·6	..	..	..	20·2	..	22·2	..
4	Digestive „ ..	49·5	..	163·6	..	44·3	..	..	..
5	Urinary „ ..	..	..	..	..	..	..	..	..
6	Reproductive „ ..	43·0	..	..	..	..	..	14·8	..
7	Locomotive „ ..	5·2	..	..	..	..	..	..	..
8	Integumentary „ ..	169·3	..	218·2	..	137·1	..	74·1	..
	Class V.								
1	Accidents	110·7	..	272·7	18·18	52·4	..	59·3	..
4	Suicide	..	1·30	..	..	8·1	4·03	..	..
6	Corporal Punishment..	..	..	..	..	..	..	7·4	..
	Total ..	1106·9	6·50	1163·6	18·18	786·2	20·15	711·0	..
	Ratio per 1,000 in 1859–62 ..	1040·7	8·00	915·3	7·93	1262·7	24·09	1423·1	6·69

The admissions in Barbadoes and St. Lucia have been in excess of the previous average, but in Trinidad and British Guiana very much below it. In all the stations miasmatic diseases were much lower than in 1862, but the reduction was most striking in British Guiana, where the ratio was scarcely one-third of the proportion in that year. The increase in venereal appears to have taken place chiefly at Barbadoes.

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2. Black Troops.

During the year several changes took place in the black troops doing duty in this Command. Detachments of the 2nd West India Regiment, from the West Coast of Africa, relieved detachments of the 3rd West India Regiment, which proceeded to the West Coast, and the Head-Quarters 1st West India Regiment, in the end of October, embarked for Nassau, and were replaced by the Head-Quarters of the 2nd West India Regiment from that station.

The average strength of this class of troops during the year was 970; the admissions into hospital among them were 786 and the deaths 16, being respectively in the ratio of 810 and 16·48 per 1,000 of the mean strength. One of the deaths occurred out of hospital. These proportions correspond very closely with the results of the preceding year.

Windward and Leeward Command.

The following Table shows the influence of the different classes of diseases in producing sickness and mortality among the black troops. The details for 1863 are given in No. XVI. of Appendix.

		1863.				1859-62.	
	Diseases.	Strength 970.		Ratio per 1,000.		Ratio per 1,000.	
Orders.		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic Diseases	173	2	178·4	2·06	300·1	5·00
2	Enthetic "	270	..	278·4	..	201·1	..
3	Dietic "	..	..	..	..	·7	..
4	Parasitic "	15	..	15·5	..	1·1	..
	Class II.						
1	Diathetic Diseases	3	..	3·1	..	5·2	·44
2	Tubercular "	14	6	14·4	6·18	15·9	5·88
	Class III. Diseases of the—						
1	Nervous System	17	..	17·5	..	16·8	1·96
2	Circulatory "	..	..	..	..	3·7	1·09
3	Respiratory "	48	4	49·5	4·12	82·9	2·39
4	Digestive "	28	3	28·9	3·09	37·4	·65
5	Urinary "	4	..	4·1	..	1·5	·65
6	Reproductive "	16	..	16·5	..	10·5	..
7	Locomotive "	4	..	4·1	..	2·8	..
8	Integumentary "	130	..	134·0	..	140·2	·22
	Class IV.						
4	Diseases of Nutrition	..	..	..	..	1·7	·41
	Class V.						
1	Accidents	60	..	61·8	..	72·9	·65
3	Homicide	..	..	..	..	·4	·65
4	Suicide	1	1	1·0	1·03	..	·65
5	Execution	..	..	..	..	..	·22
6	Corporal punishment	2	..	2·1	..	5·4	..
	Diseases not specified	1	..	1·0	..	14·4	..
	Total	786	16	810·3	16·48	914·7	20·89

This Table shows both the sickness and mortality in 1863 to have been considerably under the average of the four preceding years. The reduction has been chiefly in miasmatic diseases, and those of the respiratory system, while there has been an increase in venereal. Compared with 1862 there has been no reduction in the admissions generally, but those by miasmatic diseases have been more than one-third lower, and by venereal one-third higher than in that year.

MIASMATIC DISEASES.—The admissions and deaths by the principal groups in this class have been as follows :—

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Mean Strength. 1863. Admitted.	1863. Died.	1859-62. Admitted.	1859-62. Died.
Eruptive Fevers	4	..	4·1	..	27·9	·44
Paroxysmal „	52	2	53·6	2·06	93·6	1·74
Continued „	4	..	4·1	..	12·4	·86
Dysentery, Diarrhœa, and Cholera ..	18	..	18·6	..	17·8	1·30
Sorethroat and Influenza	9	..	9·3	..	26·8	..
Ophthalmia	13	..	13·4	..	25·2	..
Rheumatism	70	..	72·2	..	85·7	·44

The reduction in this class of diseases has extended to all the groups except dysentery and diarrhœa, but has been less marked in rheumatism than in the others; indeed, as compared with 1862, the admissions by this disease have experienced an increase.

TUBERCULAR DISEASES have given rise to two-fifths of the deaths, and, as in the preceding year, have been the chief cause of mortality among the black troops.

DISEASES OF THE RESPIRATORY SYSTEM have been much less prevalent, but nearly twice as fatal as on the average of the four preceding years.

The relative sickness and mortality at the different subordinate stations are shown in the following Table, framed from Abstract No. XVI. of Appendix.

Windward and Leeward Command.

Orders.	Diseases.	Annual Ratio per 1,000 of Strength in 1863.					
		Barbadoes.		Trinidad.		British Guiana.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic Diseases	194·9	1·71	204·1	..	139·1	3·76
2	Enthetic "	386·3	..	153·1	..	109·0	..
3	Dietic "	..	..	..	..	..	..
4	Parasitic "	23·9	..	10·2	..	3·8	..
	Class II.						
1	Diathetic Diseases	3·4	..	..	..	3·8	..
2	Tubercular "	20·5	8·55	10·2	..	3·8	..
	Class III. Diseases of the						
1	Nervous System	25·6	..	10·2	..	3·8	..
2	Circulatory "	..	..	..	..	..	..
3	Respiratory "	68·4	5·13	10·2	..	26·3	3·76
4	Digestive "	29·1	1·71	20·4	..	33·8	3·76
5	Urinary "	6·8	..	..	..	..	..
6	Reproductive "	18·8	..	20·4	..	11·3	..
7	Locomotive "	5·1	..	10·2	..	..	..
8	Integumentary "	178·2	..	91·8	..	60·1	..
	Class IV.						
4	Diseases of Nutrition	..	..	..	..	..	..
	Class V.						
1	Accidents	61·5	..	40·8	..	75·2	..
4	Suicide	..	..	..	10·20	..	..
6	Corporal Punishment	3·4	..	..	..	..	..
	Diseases not stated	..	..	..	..	3·8	..
	Total	1025·9	17·10	581·6	10·20	473·8	11·28
	Average of 1859-62	1017·4	20·52	834·5	20·98	792·7	21·15

This Table shows a reduction in the admissions in Trinidad and British Guiana, but no change at Barbadoes. The force at St. Lucia was too small to justify any deductions from it. As among the white troops, the excess of venereal among the black has occurred at Barbadoes, and miasmatic diseases have been lower than in 1862 at all the stations.

II. JAMAICA.

I. WHITE TROOPS.

Jamaica. The force employed in Jamaica consisted of Royal Artillery, the Head-Quarters of the 1st Battalion 14th Regiment, and the European non-commissioned officers of the West India Regiment. The average strength during the year was 650, the admissions into hospital amounted to 616, and the deaths to six, of which one occurred out of hospital. There were no deaths among the invalids. These numbers give the proportion of 948 admissions and 9·02 deaths per 1,000 of mean strength, the former being nearly one-half higher, and the latter one-fourth lower than the ratio in 1862. *Jamaica.*

The following Table shows the admissions and deaths by the different classes of diseases. The details for 1863 are given in Abstract No. XV. of Appendix.

Order.	Diseases.	1863.						1859-62.	
		Strength, 650.				Ratio per 1,000.		Ratio per 1,000.	
		Admissions.	Deaths.						
			In Jamaica.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	240	3	..	3	369·2	4·61	329·8	6·65
2	Enthetic ,, ..	63	..	..	..	96·9	..	102·9	..
3	Dietic ,, ..	33	..	..	..	50·8	..	26·6	·39
4	Parasitic ,, ..	5	..	..	..	7·7	..	3·5	..
	Class II.								
1	Diathetic Diseases.. ..	4	..	..	..	6·2	..	1·6	..
2	Tubercular ,, ..	9	1	..	1	13·8	1·47	5·5	1·96
	Class III. Diseases of the—								
1	Nervous System ..	21	..	..	..	32·3	..	15·2	1·57
2	Circulatory ,, ..	3	1	..	1	4·6	1·47	5·9	·78
3	Respiratory ,, ..	51	..	..	..	78·5	..	48·1	..
4	Digestive ,, ..	23	..	..	..	35·4	..	91·9	1·17
5	Urinary ,, ..	1	..	..	..	1·5	..	1·6	..
6	Reproductive ,, ..	..	..	..	..	..	..	1·6	..
7	Locomotive ,, ..	1	..	..	..	1·5	..	·8	..
8	Integumentary ,, ..	96	..	..	..	147·7	..	132·2	..
	Class IV.								
4	Diseases of Nutrition ..	3	..	..	..	4·6	..	2·7	..
	Class V.								
1	Accidents	60	..	..	..	92·3	..	120·9	..
3	Homicide	..	..	..	..	..	..	..	·39
4	Suicide	..	1	..	1	..	1·47	·4	1·17
6	Corporal Punishment ..	3	..	..	..	4·6	..	3·5	..
	Diseases not specified ..	..	..	..	..	..	..	1·6	..
	Total	616	6	..	6	947·6	9·02	896·3	14·08

This Table shows the admissions into hospital in 1863 to have been considerably above and the deaths below the average of the four preceding years. The difference in the former has been chiefly in miasmatic and dietic diseases, and those of the respiratory system, and in the deaths in miasmatic diseases and those of the nervous and digestive systems.

MIASMATIC DISEASES, when subdivided into groups, give the following results:—

Jamaica.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859-62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	..	..	..	..	·4	..
Paroxysmal "	100	2	153·9	3·08	63·4	3·91
Continued "	29	..	44·6	..	74·3	2·35
Dysentery, Diarrhœa, &c. ..	39	..	60·0	..	42·2	·39
Sorethroat and Influenza ..	21	..	32·3	..	9·0	..
Ophthalmia	24	..	36·9	..	116·6	..
Rheumatism	17	1	26·1	1·54	18·4	..

Paroxysmal fevers, dysentery and diarrhœa, and sorethroat and influenza, are the diseases in which the excess above the previous average took place, while there was a decrease in continued fevers and in ophthalmia. The increase in paroxysmal fevers and in dysentery and diarrhœa appears to have been occasioned chiefly by the necessity (arising from there being a deficiency of black troops) for detaching three companies of the 14th Regiment from Newcastle to Up Park Camp during the autumnal months, when these diseases are most prevalent. More than half the cases occurred in the detachment during the three months (July to September) it occupied this station. There was also a company of the regiment at Port Royal from July to November. The effect of this upon the prevalence of these diseases was as follows :—

	Ratio of Admissions per 1,000 of Strength.		
	Newcastle.	Port Royal.	Up Park Camp.
Paroxysmal Fevers	48·3	103·1	547·6
Dysentery and Diarrhœa	50·9	108·2	..

ENTHETIC DISEASES, though slightly under the previous average, have been twice as common as in 1862.

DIETIC DISEASES have been extremely prevalent. The only disease under this head has been intemperance, of which 33 cases were admitted, 12 at Newcastle, 10 at Port Royal, and 10 at Up Park Camp. In addition to these there were seven cases of *delirium tremens*, but neither disease was the direct cause of death during the year.

DISEASES OF THE RESPIRATORY SYSTEM were much in excess of the average. The increase was at Newcastle, and in cases of bronchitis.

II. BLACK TROOPS.

The average strength of black troops in Jamaica in 1863 was 477 ; the admissions into hospital among them were 682, and the deaths 13, of which two occurred out of hospital. The ratio of admissions therefore was 1,430, and of deaths 27·66 per 1,000 of the strength, the former being considerably above, the latter 3 per 1,000 below the proportion in 1862.

The diseases by which the admissions and deaths were caused are stated in Abstract No. XVI. of Appendix. The following Table shows the influence of the different classes of diseases on the health of the black troops in this island.

Order.	Diseases.	1863. Strength, 477. Admitted.	1863. Strength, 477. Died at Jamaica.	1863. Ratio per 1,000. Admitted.	1863. Ratio per 1,000. Died.	1859-62. Ratio per 1,000. Admitted.	1859-62. Ratio per 1,000. Died.
	Class I.						
1	Miasmatic Diseases.. ..	223	2	467·5	4·19	437·1	6·55
2	Enthetic „	224	..	469·6	..	284·4	1·04
3	Dietic „	2	..	4·2	..	2·1	..
4	Parasitic „	6	..	12·6	..	1·7	..
	Class II.						
1	Diathetic Diseases	4	..	8·4	..	5·9	1·04
2	Tubercular „	10	3	21·0	6·29	15·5	6·20
	Class III. Diseases of the—						
1	Nervous System ..	11	..	23·1	..	23·8	2·07
2	Circulatory „	5	1	10·5	2·20	1·7	·69
3	Respiratory „	60	4	125·8	8·38	73·1	6·20
4	Digestive „	19	1	39·8	2·20	41·0	2·42
5	Urinary „	..	..	..	..	4·1	..
6	Reproductive „	9	..	18·9	..	8·6	..
7	Locomotive „	5	..	10·5	..	2·4	..
8	Integumentary, ...	53	..	111·1	..	118·6	·34
	Class IV.						
4	Diseases of Nutrition ..	..	..	..	..	·3	..
	Class V.						
1	Accidents	51	1	106·9	2·20	60·0	·69
3	Homicide	..	..	..	..	·3	·34
4	Suicide	..	1	..	2·20	..	·69
5	Execution	..	..	..	..	..	·34
6	Corporal punishment ..	..	..	..	..	5·9	..
	Diseases not specified ..	..	..	..	..	3·8	..
	Total	682	13	1429·9	27·66	1090·3	28·61

The excess of the admissions over the average of the four preceding years has been the result chiefly of venereal, diseases of the respiratory system, and accidents.

Miasmatic Diseases.—The admissions have been rather higher but the deaths lower than the previous average. The influence of the principal groups in this class has been as follows:—

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Mean Strength. 1863. Admitted.	Annual Ratio per 1,000 of Mean Strength. 1863. Died.	Annual Ratio per 1,000 of Mean Strength. 1859–62. Admitted.	Annual Ratio per 1,000 of Mean Strength. 1859–62. Died.
Eruptive Fevers	..	..	..	..	7·2	..
Paroxysmal „	108	2	226·4	4·19	277·1	3·10
Continued „	2	..	4·2	..	22·4	1·72
Dysentery, Diarrhœa, and Cholera	10	..	20·9	..	23·8	1·38
Sorethroat and Influenza	54	..	113·2	..	18·3	..
Ophthalmia..	10	..	20·9	..	20·7	..
Rheumatism	38	..	79·7	..	64·1	·34

Jamaica.

The increase in the admissions has been almost exclusively due to sorethroat (*tonsillitis*), which prevailed to a great extent among the civil population also during the first half of the year. Paroxysmal fevers were below the average.

ENTHETIC DISEASES were greatly above the average. No explanation of the cause of this is given in the medical officers' reports.

DIETIC DISEASES.—The comparatively low ratio of admissions by this class forms a striking contrast with that of the white troops. Only two cases of intemperance were admitted into hospital from the black troops.

DISEASES OF THE RESPIRATORY SYSTEM show a great increase. This was confined to the same period of the year as the prevalence of sorethroat already noticed. The deaths by tubercular diseases and those of the respiratory system still constitute the greater portion of the mortality, seven out of thirteen deaths having been caused by these two classes.

III. BAHAMAS.

Bahamas.

The white troops employed in the Bahamas consisted of a detachment of Royal Artillery of the average strength of 11 men, among whom 13 cases occurred, and no deaths. The black troops were the Head-Quarters of the 2nd West India Regiment till the middle of November, when they were relieved by the Head-Quarters of the 1st West India Regiment.

The average strength of the black troops was 414; the admissions into hospital were 240, and the deaths 6, one of them out of hospital. The ratio of admissions, therefore, was 580, and of deaths, 14·48 per 1,000 of mean strength, being very much lower than the results for 1862.

The influence of the different classes of diseases in producing this sickness and mortality is shown in the following Table. The details for 1863 are given in abstract No. XVI. of Appendix.

Bahamas.

Order.	Black Troops. / Diseases.	1863. Strength, 414. Admitted.	Died.	1863. Annual Ratio per 1,000. Admitted.	Died.	1859-62. Annual Ratio per 1,000. Admitted.	Died.
	Class I.						
1	Miasmatic Diseases ..	74	..	178·8	..	387·8	5·54
2	Enthetic " ..	55	..	132·9	..	171·7	·69
3	Dietic " ..	2	..	4·8	..	2·8	..
4	Parasitic " ..	5	..	12·1	..	4·8	..
	Class II.						
1	Diathetic Diseases ..	1	..	2·4	..	4·2	·69
2	Tubercular " ..	5	4	12·1	9·66	18·7	10·39
	Class III. Diseases of the—						
1	Nervous System ..	1	..	2·4	..	15·9	2·08
2	Circulatory " ..	2	1	4·8	2·41	2·1	..
3	Respiratory " ..	21	..	50·7	..	54·7	6·23
4	Digestive " ..	7	1	16·9	2·41	15·9	2·08
5	Urinary " ..	4	..	9·7	..	2·1	..
6	Reproductive " ..	2	..	4·8	..	18·7	..
7	Locomotive " ..	3	..	7·2	..	·7	..
8	Integumentary " ..	29	..	70·0	..	73·4	·69
	Class IV.						
4	Diseases of Nutrition ..	..	..	..	..	2·1	..
	Class V.						
1	Accidents	25	..	60·4	..	56·8	..
4	Suicide	..	..	..	..	·7	·69
6	Corporal punishment ..	4	..	9·7	..	2·1	..
	Diseases not specified ..	..	..	..	..	5·5	..
	Total	240	6	579·7	14·48	840·7	29·08

This Table shows a very great reduction in miasmatic diseases and a slight diminution of venereal. In other respects the results do not materially differ from the previous average. The difference in the mortality has been chiefly in miasmatic diseases and those of the respiratory system, but the ratio of deaths from tubercular diseases is still very high.

No cases of yellow fever occurred among the troops during the year under review.

IV. HONDURAS.

Honduras.

In the beginning of the year the detachment of the 3rd was relieved by three companies of the 1st West India Regiment. There were only four white non-commissioned officers employed at the station. The average strength of the black troops was 322; the admissions into hospital amounted to 218 and the deaths to 6, one of which was out of hospital. The ratio of admissions, therefore, was 677, and of deaths 18·63 per 1,000 of the strength, the former being very much under and the latter slightly over the proportion in 1862.

The admissions and deaths by the different classes of diseases are shown in the following Table; the details for 1863 will be found in Abstract No. XVI. of Appendix.

Honduras.

Order.	Black Troops.	1863.				1859-62.	
		Strength, 322.		Annual Ratio per 1,000.		Annual Ratio per 1,000.	
	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic Diseases ..	111	..	344·8	..	566·7	3·64
2	Enthetic " ..	35	..	108·7	..	97·7	..
3	Dietic " ..	1	..	3·1	..	2·9	2·19
4	Parasitic " ..	..	..	..	..	11·7	..
	Class II. ..						
1	Diathetic Diseases ..	..	..	..	..	6·6	..
2	Tubercular " ..	3	2	9·3	6·21	5·1	2·19
	Class III. Diseases of the—						
1	Nervous System ..	3	1	9·3	3·11	18·2	1·46
2	Circulatory " ..	1	1	3·1	3·11	3·6	2·91
3	Respiratory " ..	5	1	15·5	3·11	64·9	·73
4	Digestive " ..	7	..	21·7	..	48·2	·73
5	Urinary " ..	..	..	..	..	2·9	..
6	Reproductive " ..	2	..	6·2	..	15·3	..
7	Locomotive " ..	1	..	3·1	..	3·6	..
8	Integumentary " ..	24	..	74·5	..	193·4	·73
	Class IV.						
4	Diseases of Nutrition..	..	..	..	..	1·5	..
	Class V.						
1	Accidents	25	..	77·7	..	105·8	1·46
3	Homicide	..	..	..	..	..	·73
4	Suicide	..	..	..	..	..	·73
5	Execution	..	1	..	3·11	..	..
6	Corporal punishment..	..	..	..	..	8·8	..
	Diseases not specified..	..	..	..	..	2·2	·73
	Total ..	218	6	677·0	18·65	1164·1	18·23

The reduction in the admissions has been chiefly in miasmatic diseases and those of the integumentary system, and also in diseases of the respiratory and digestive systems and in accidents. This may probably be, to some extent, the result of the change of troops in the beginning of the year. If so, we may expect an increase in these diseases during the next year.

The death returned under the head of Execution was that of a private of the 3rd West India Regiment, who was hanged for murder.

Section II.

On the extent of Invaliding.

There were 8 invalids sent home recommended for discharge, and 33 for change of climate, from the Windward and Leeward Command, and 9 for discharge and 9 for change from Jamaica. The diseases which caused the invaliding are classed in the following Table, framed from Abstract No. XVII. of Appendix.

Honduras.

White Troops	Windward and Leeward Command. Mean Strength, 1,210.		Jamaica. Mean Strength, 650.	
	Recommended for—		Recommended for—	
Diseases.	Discharge.	Change of Climate.	Discharge.	Change of Climate.
Miasmatic Diseases	3	11	1	6
Parasitic "	..	1	..	..
Diathetic "	..	1	..	..
Tubercular "	..	6	1	1
Diseases of the—				
Nervous System	1	4	2	..
Circulatory "	..	1	..	..
Respiratory "	..	2	2	2
Digestive "	..	1	1	..
Reproductive "	1	3	..	..
Integumentary "	..	3	1	..
Accidents and Violence	3	..	1	..
Total	8	33	9	9
Ratio per 1,000 of Strength 1863	6·6	27·3	13·8	13·8
Ratio per 1,000 of Strength 1861–62	13·3	23·0	3·0	6·0

The number sent home from the Windward and Leeward Command was slightly under the previous average. The most common disability was ophthalmia. The number from Jamaica was thrice the previous average, but that had been remarkably low.

The numbers finally discharged the service of the white troops at the Invalid Depôt in England, and of the black troops in the West Indies, with the causes of disability, are shown in the following Table, condensed from Abstract No. XVII. of Appendix. For reasons stated in last report, it is necessary to include the invalids of the black troops serving in Western Africa with those in the West Indies.

Honduras.

	White Troops.		Black Troops.
Stations	Windward and Leeward Command.	Jamaica.	West Indies and Western Africa.
Strength	1,210	650	3,506
Diseases.	Discharged as Invalids.	Discharged as Invalids.	Discharged as Invalids.
Paroxysmal Fevers	1	..	2
Dysentery and Diarrhœa..	..	1	1
Ophthalmia	10	2	1
Rheumatism	1	1	9
Venereal Diseases	..	2	2
Constitutional „	1	..	2
Tubercular „	4	2	3
Diseases of the—			
Nervous System	..	..	5
Circulatory „	2	..	1
Respiratory „	2	2	1
Digestive „	..	1	..
Generative „	2	..	..
Locomotive „	..	1	2
Integumentary „	1	1	3
Accidents and Violence	1	1	..
Total..	25	14	32
Ratio per 1,000 of Mean Strength 1863.. ..	20·7	21·5	9·1
Ratio per 1,000 of Mean Strength 1860–62 ..	26·3	15·5	22·0

The number of the white troops finally discharged the service has been rather under the average from the Windward and Leeward Command and above it from Jamaica. Ophthalmia in the former has been the only very prominent disability.

The proportion of black troops discharged has been less than half the previous average. Rheumatism and insanity were the two diseases which gave rise to the greatest number of discharges.

Section III.

Mean Daily Sick.

The average number of the white troops constantly non-effective from sickness in 1863 was, in the Windward and Leeward Command, 44, and in Jamaica 24; and of the black troops in the former, 39; in the latter, 27; in the Bahamas, 14; and in Honduras, 8. The following Table gives the results deduced from these numbers.

Honduras.

		White Troops.		Black Troops.			
		Windward and Leeward Command.	Jamaica.	Windward and Leeward Command.	Jamaica.	Bahamas.	Honduras.
Ratio per 1,000 constantly Sick.	1863 ..	36·36	36·92	40·21	56·60	33·82	24·84
	1859–62*..	40·40	34·43	37·43	55·15	43·28	36·22
		days.	days.	days.	days.	days.	days.
Mean Sick Time to each Soldier.	1863 ..	13·27	13·48	14·68	20·66	12·34	9·07
	1859–62*..	14·74	12·57	13·66	20·13	15·80	13·22
Average Duration of the Cases.	1863 ..	13·23	14·22	18·11	14·45	21·29	13·39
	1859–62*..	13·26	14·02	14·94	18·46	18·79	10·49

There has been a decrease in the mean daily sick of the white troops in the Windward and Leeward Command, and an increase in Jamaica. The latter result has probably arisen from the employment of part of the force at Up Park Camp during the autumn. Among the black troops there has been a marked decrease in the Bahamas and Honduras, but attended with an increase in the average duration of the cases. Among the white troops the duration of the cases has differed little from the previous results, but among the black there has been a considerable increase in the Windward and Leeward Command, and a corresponding decrease in Jamaica.

Section IV.

Influence of Age on the Mortality.

West Indies.

The following Table shows the mortality at different ages among the troops serving in the West Indies. The details are stated in Abstract No. XVIII. of Appendix.

		Under 20 Years.	20–24	25–29	30–34	35–39	40 and upwards.
White Troops— Ratio of Deaths per 1,000 of Strength.	1863 ..	..	3·73	12·08	8·13	..	125·0
	1861-62	..	4·65	8·36	12·05	21·13	..
Black Troops— Ratio of Deaths per 1,000 of Mean Strength.	1863 ..	15·46	16·60	17·01	6·87	8·16	35·71
	1859-62	15·79	24·81	21·42	26·79	20·16	22·39

This Table does not show any excessive increase of mortality with the advance of age, a result which was formerly very marked in the West Indies. The numbers above 35 are too few to justify dependence upon the results. Among the black troops the mortality is higher at all periods under 35 than among the white, but there is no remarkable increase at the more advanced ages.

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* The ratios for Bahamas and Honduras are those of 1861–62 only.

V.—ON THE HEALTH OF THE TROOPS SERVING IN WESTERN AFRICA.

Western Africa. In February, the Head-Quarters of the 3rd West India Regiment arrived at Sierra Leone to relieve the 2nd West India Regiment, which returned to the West Indies by detachments during the year, and in August the right wing of the 4th West India Regiment arrived at Cape Coast Castle to replace the Gold Coast Artillery Corps which was disembodied.

The average strength of the European non-commissioned officers serving in Western Africa throughout the year was 29, and of these two died on the Gold Coast, one of *delirium tremens* and the other of intermittent fever.

The strength of the black troops, with the admissions into hospital and deaths during the year were as follows:—

	Average Strength.	Admissions into Hospital.	Deaths	Ratio per 1,000 of Strength.		1859–62. Ratio per 1,000.	
				Admitted	Died.	Admitted	Died.
Sierra Leone ..	430	484	11	1125·6	25·59	740·5	29·53
The Gambia ..	249	415	7	1666·6	28·12	978·5	33·74
Lagos	98	297	10	3030·6	102·05	1885·7	28·57
The Gold Coast ..	546	622	24	1139·1	43·95	624·0	26·45

This Table shows a great increase in the admissions compared with the average of the four preceding years. The deaths at Sierra Leone and the Gambia have been under the average, but on the Gold Coast and at Lagos greatly in excess of it.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. XIX. of Appendix. The following Table shows the influence of the different classes of diseases upon the health of the troops at each of the stations.

Western Africa.

Orders.	Stations	Sierra Leone.						Gambia.						Lagos.						Gold Coast.					
	Strength	430.						249.						98.						546.					
	Diseases.			1863.		1859–62.				1863.		1859–62.				1863.		1862.				1863.		1859–62.	
				Annual Ratio per 1,000.		Annual Ratio per 1,000.				Annual Ratio per 1,000.		Annual Ratio per 1,000.				Annual Ratio per 1,000.		Annual Ratio per 1,000.				Annual Ratio per 1,000.		Annual Ratio per 1,000.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.																								
1	Miasmatic Diseases	163	3	379·1	6·98	227·1	4·92	227	2	911·6	8·03	458·6	4·60	103	8	1051·1	81·65	838·1	28·57	333	22	609·9	40·29	102·5	4·96
2	Enthetic ,, ..	97	..	225·6	..	142·0	..	61	1	245·0	4·02	152·6	1·53	86	..	877·6	..	581·0	..	80	..	146·5	..	41·8	..
3	Dietic ,, ..	2	..	4·7	..	1·4	·70	..	..	..	..	3·1	..	..	..	..	..	47·6	..	1	..	1·8	..	1·7	..
4	Parasitic ,, ..	32	..	74·4	..	19·0	..	2	..	8·0	..	13·8	..	..	..	..	..	..	..	7	..	12·8	..	223·1	..
	Class II.																								
1	Diathetic Diseases ..	2	..	4·7	..	4·2	..	6	..	24·1	..	9·2	2·30	1	..	10·2	..	..	..	1	..	1·8	..	·8	..
2	Tubercular ,, ..	8	4	18·6	9·30	16·2	7·74	2	..	8·0	..	13·8	9·20	2	..	20·4	..	..	..	1	1	1·8	1.83	4·9	3·31
	Class III. Diseases of the—																								
1	Nervous System ..	12	..	27·9	..	14·1	4·22	2	..	8·0	..	15·8	1·53	4	1	40·8	10·20	9·5	..	12	1	22·0	1·83	11·6	3·31
2	Circulatory ,, ..	..	..	..	..	1·4	..	1	..	4·0	..	2·3	1·53	..	..	..	..	..	..	2	..	3·7	..	..	·83
3	Respiratory ,, ..	28	1	65·1	2·33	66·8	4·92	23	1	92·4	4·02	94·8	8·43	8	..	81·6	..	19·1	..	12	..	22·0	..	28·9	4·13
4	Digestive ,, ..	13	3	30·2	6·98	26·0	4·22	25	3	100·4	12·05	27·6	·77	29	..	295·9	..	9·5	..	16	..	29·3	..	24·0	2·47
5	Urinary ,, ..	3	..	7·0	..	1·4	..	1	..	4·0	..	3·8	·77	2	..	20·4	..	..	..	2	..	3·7	..	3·3	..
6	Reproductive ,, ..	9	..	20·9	..	5·6	..	4	..	16·1	..	3·1	..	7	..	71·4	..	38·1	..	2	..	3·7	..	5·8	..
7	Locomotive ,, ..	7	..	16·3	..	12·7	·70	4	..	16·1	..	8·4	·77	1	..	10·2	..	..	..	1	..	1·8	..	12·4	..
8	Integumentary ,, ..	70	..	162·8	..	123·8	..	27	..	108·4	..	95·9	..	24	..	244·9	..	209·5	..	112	..	205·1	..	99·2	..
	Class IV.																								
4	Diseases of Nutrition	..	..	..	..	·7	..	..	..	..	..	1·5	..	..	..	..	..	..	..	..	..	..	..	..	..
	Class V.																								
1	Accidents	17	..	39·5	..	55·6	..	30	..	120·5	..	56·8	..	10	..	102·0	..	85·7	..	36	..	65·9	..	56·2	4·96
2	Battle	16	..	37·2	..	14·8	2·11	..	..	..	..	8·4	..	17	1	173·5	10·20	..	..	..	..	..	..	..	..
3	Homicide	..	..	..	..	..	..	..	..	..	..	·8	·77	..	..	..	..	..	..	..	..	..	..	..	..
4	Suicide	..	..	..	..	..	..	..	..	..	..	..	·77	..	..	..	..	..	..	..	..	..	..	..	·83
5	Execution	..	..	..	..	..	..	..	..	..	..	..	·77	..	..	..	..	..	..	..	..	..	..	..	1·65
6	Corporal Punishment	5	..	11·6	..	5·6	..	..	..	..	..	4·6	..	3	..	30·6	..	47·6	..	4	..	7·8	..	5·8	..
	Diseases not specified	..	..	..	..	2·1	..	..	..	..	..	4·6	..	..	..	..	..	..	..	..	..	..	..	2·5	..
	Total	484	11	1125·6	25·59	740·5	29·53	415	7	1666·6	28·12	978·5	33·74	297	10	3030·6	102·05	1885·7	28·57	622	24	1139·1	43·95	624·0	26·45

Western Africa.

Miasmatic Diseases have been more prevalent and fatal at all the stations than formerly, and it is to them that the excessive mortality at Lagos and on the Gold Coast have been due. The following Table shows the admissions by the principal groups of diseases comprised in this class.

Diseases.	Sierra Leone.			The Gambia.			Lagos.			The Gold Coast.		
	Admitted in 1863.	Ratio per 1,000 Admitted. 1863.	Ratio per 1,000 Admitted. 1859-1862.	Admitted in 1863.	Ratio per 1,000 Admitted. 1863.	Ratio per 1,000 Admitted. 1859-1862.	Admitted in 1863.	Ratio per 1,000 Admitted. 1863.	Ratio per 1,000 Admitted. 1862.	Admitted in 1863.	Ratio per 1,000 Admitted. 1863.	Ratio per 1,000 Admitted. 1859-1862.
Eruptive Fevers	1	2·3	23·2	7	28·1	48·7	3	30·6	..	..	..	5·8
Paroxysmal "	97	225·6	98·4	129	518·1	293·7	51	520·4	438·1	106	194·1	10·7
Continued "	..	..	2·8	..	..	8·4	1	10·2	..	..	..	1·6
Dysentery & Diarrhœa..	17	39·5	20·4	66	265·1	58·3	28	285·7	266·6	171	313·2	31·4
Sorethroat & Influenza..	5	11·6	4·2	2	8·0	8·4	1	10·2	..	7	12·8	·8
Ophthalmia ..	11	25·6	11·2	8	32·1	13·0	..	..	..	10	18·3	19·0
Rheumatism ..	26	60·5	56·3	15	60·2	27·6	16	163·3	133·3	36	65·9	25·6

Paroxysmal Fevers have been greatly above the average at all the stations. They were not, however, of a fatal character, only three deaths having been caused by them, one at the Gambia, one at Lagos, and the third on the Gold Coast.

Dysentery and Diarrhœa have been a source of great inefficiency except at Sierra Leone, and have been the chief cause of mortality, the deaths having been 3 at Sierra Leone, 1 at the Gambia, 7 at Lagos, and 20 on the Gold Coast. Two of the deaths at Sierra Leone were of men landed in a dying state from the Gold Coast, where they had contracted the disease. The very great increase of dysentery among the troops on the Gold Coast was probably the result of the duty on which they were employed during the latter half of the year. With a view to preparations for a campaign against the Ashantees, the troops were engaged from August to December in cutting paths through the bush, collecting stores, &c., and were consequently much exposed to malaria, and underwent great fatigue. In addition to this, the force was composed chiefly of young West Indians recently enlisted, unaccustomed to the duties of soldiers, and ignorant of the country in which they were employed. The result was a great amount of dysentery of an aggravated character, one in seven of the cases having terminated fatally.

Enthetic Diseases show a great increase in the admissions. They are stated to have occurred principally among the troops just arrived from the West Indies.

Parasitic Diseases.—Only seven cases of Guinea-worm appear in the returns from the Gold Coast, where it was formerly so very prevalent; six of these occurred in the Gold Coast Corps, and one in the 4th West India Regiment. Five cases were admitted at Sierra Leone, but the disease appears to have been contracted at Gambia or on the Gold Coast.

Diseases of the Digestive System were very much above the previous amount in Lagos, the difference being in cases of colic. Unfortunately the reports from this station are very meagre, and no explanation of this increase is given.

Violence.—The sixteen cases returned from Sierra Leone, in the second order, as injuries received in battle, were cases of gunshot wounds sent from Lagos, on account of there being no adequate hospital accommodation there. These wounds were received in a skirmish with the natives at Essè, on the Lagos River, on the 12th of March; 123 men were engaged, 1 was killed, and 16 wounded.

The invaliding from Western Africa has been already noticed along with that of the troops serving in the West Indies.

Western Africa.

The average number constantly non-effective from sickness during the year was, at Sierra Leone, 19, the Gambia 13·5, Lagos 13, and the Gold Coast 28. These numbers give the following results :—

		Sierra Leone.	The Gambia.	Lagos.	The Gold Coast.
Ratio per 1,000 constantly sick	1863 ..	44·19	50·20	132·65	51·28
	1861–62..	39·30	36·72	*85·71	25·89
		Days.	Days.	Days.	Days.
Average sick time to each soldier	1863 ..	16·13	18·32	48·42	18·72
	1861–62..	14·34	13·40	*31·28	9·45
Average duration of cases of sickness	1868 ..	13·68	10·99	15 98	16·43
	1861–62..	15·72	11·85	*16·59	15·96

There has been a great increase in the mean daily sick at all the stations, but particularly at Lagos and the Gold Coast. There has also been an increase in the average sick time to each soldier serving, but a reduction in the duration of the cases, except on the Gold Coast.

The results for Lagos, a station first occupied in the end of December 1861, are very unsatisfactory as regards the health of the troops. The admissions into hospital in 1863 amounted to three times the number serving. Death literally decimated the force, and on the average of the year between one-seventh and one-eighth of the men were constantly sick in hospital.

VI.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF ST. HELENA.

St. Helena.

The garrison consisted, as in the preceding year, of Royal Artillery, Royal Engineers, and the St. Helena Regiment. The average strength was 624; the admissions into hospital were 513; the deaths in hospital 3, out of hospital 1, and of invalids 1, making a total of 5. These numbers give the proportion of 822 admissions and 8 deaths per 1,000 of mean strength, which are both less than the average of the four preceding years.

The influence of the different classes of diseases in producing sickness and mortality are shown in the following Table. The details for 1863 will be found in Abstract No. XX. of Appendix.

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* These ratios are for 1862 only, Lagos not having been previously occupied by troops.

St. Helena.

Order.	Diseases.	Strength, 624.				Ratio per 1,000 of Strength.			
			Died.			1863.		1859–62.	
		Admitted.	At St. Helena.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	191	2	..	2	306·1	3·20	355·6	2·61
2	Enthetic " ..	51	..	..	..	81·7	..	96·4	..
3	Dietic " ..	24	..	..	..	38·5	..	42·6	·43
4	Parasitic " ..	2	..	..	..	3·2	..	2·6	..
	Class II.								
1	Diathetic Diseases ..	4	..	..	..	6·4	..	5·2	·43
2	Tubercular "	7	..	1	1	11·2	1·60	3·5	1·74
	Class III. Diseases of the—								
1	Nervous System ..	15	1	..	1	24·0	1·60	27·4	2·17
2	Circulatory " ..	3	..	..	..	4·8	..	8·2	·43
3	Respiratory " ..	29	..	..	..	46·5	..	47·3	·87
4	Digestive " ..	41	1	..	1	65·7	1·60	55·1	·43
5	Urinary " ..	2	..	..	..	3·2	..	3·9	..
6	Reproductive " ..	2	..	..	..	3·2	..	3·5	..
7	Locomotive " ..	2	..	..	..	3·2	..	1·7	..
8	Integumentary " ..	30	..	..	..	48·1	..	77·7	..
	Class V.								
1	Accidents	108	..	..	..	173·1	..	143·3	2·17
6	Corporal Punishment ..	2	..	..	..	3·2	..	·9	..
	Diseases not specified ..	..	..	..	..	..	..	5·2	..
	Total	513	4	1	5	822·1	8·00	880·1	11·28

The reduction in the prevalence of diseases has been chiefly in the miasmatic class. The admissions by diseases of the digestive system and by accidents have been considerably above the average.

Miasmatic Diseases, when subdivided, give the following results:—

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859–62.	
			Admitted	Died.	Admitted	Died.
Eruptive Fevers	..	..	..	..	..	..
Paroxysmal "	10	..	16·03	..	32·13	·43
Continued "	26	..	41·67	..	125·75	1·74
Dysentery and Diarrhœa ..	48	2	76·92	3·20	103·78	·43
Sorethroat and Influenza ..	34	..	54·49	..	13·03	..
Ophthalmia	13	..	20·83	..	27·35	..
Rheumatism	24	..	38·46	..	26·49	..

The reduction in the prevalence of these diseases compared with the average of the four preceding years has been in continued and paroxysmal fevers, and in dysentery and diarrhœa; but the admissions by these diseases closely approximate the amount in 1862. In the report for that year the great reduction was attributed to the establishment of a camp at Deadwood, and the frequent change of the men from the barracks in James' Town to Ladder Hill

St. Helena.

and the camp; and the beneficial effects of this system have continued to be well-marked.

There was a considerable increase in the admissions on account of sore-throat and influenza. This occurred chiefly in the second quarter of the year, when the latter disease prevailed in the island to such an extent and with such severity as to "occasion the suspension of many out-door works, and the closing of warehouses, stores, &c., throughout the island." No deaths from it occurred among the troops, but it is said to have proved fatal in many instances among the civil population.

During the year there were 13 men sent home as invalids, 2 recommended for discharge, and 11 for change of climate. There were 2 finally discharged the service at the Invalid Depôt as unfit for further service. The diseases of these invalids were as follows:—

Invalids from St. Helena.	Sent Home, Recommended for—		Discharged the Service at Invalid Depôt.
	Discharge.	Change of Climate.	
Chronic Dysentery	..	3	..
Ophthalmia	..	2	..
Chronic Rheumatism	..	1	1
Secondary Syphilis	..	1	..
General Dropsy	..	1	..
Consumption	1	..	1
Paralysis	..	1	..
Asthma	..	1	..
Constipation	..	1	..
Inflammation of Joints	1	..	..
Total	2	11	2
Ratio per 1,000 of Mean Strength 1863	3·20	17·63	3·20
Ratio per 1,000 of Mean Strength 1860-62	4·35	9·79	5·98

Mean Sick.

The average number constantly non-effective from sickness during the year was 21. The ratio per 1,000 constantly sick, therefore, was 33·65, the average sick time to each soldier 12·28 days, and the average duration of the cases 14·94 days.

Influence of Age.

The influence of age upon mortality among the troops serving in St. Helena is shown in the following Table:—

	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength on 1st Jan.	Died during Year.	Strength on 1st Jan.	Died during Year.	Strength on 1st Jan.	Died during Year.	Strength on 1st Jan.	Died during Year.	Strength on 1st Jan.	Died during Year.	Strength on 1st Jan.	Died during Year.
Troops..	16	..	208	..	288	1	125	4	27	..	5	..
Ratio per 1,000.	..	..	..	..	..	3·47	..	32·00	..	..	..	..

VII.—ON THE HEALTH OF THE TROOPS SERVING AT THE CAPE OF GOOD HOPE.

Section I.

Sickness and Mortality.

Cape of Good Hope.

In the end of March the 96th Regiment arrived from England and relieved the 2nd Battalion 13th, which proceeded to the Mauritius. In the end of April, the 2nd Battalion 5th Regiment, from the Mauritius, relieved the 85th Regiment, which then embarked for England. With these exceptions, the force employed in this Command remained the same as in the preceding year.

The average strength of the troops during the year was 4,297; the admissions into hospital amounted to 3,616; the deaths in the Command to 46, of which 12 occurred out of hospital, and 2 invalids died on the passage home and at Netley, making a total of 48 deaths. These numbers give the ratio of 841 admissions and 11·14 deaths per 1,000 of the strength, the former being a little lower and the latter higher than in 1862.

The admissions and deaths in each corps were as follows:—

	Average Annual Strength.	Admissions into Hospital.	Deaths.				Annual ratio per 1,000 of Mean Strength.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	148	101	2	1	..	3	682	20·27
Royal Engineers ..	182	94	..	1	..	1	516	5·49
2nd Bat. 5th Regiment.	527	313	2	3	..	5	594	9·49
„ 10th „	816	455	5	1	1	7	558	8·58
„ 11th „	827	1,221	8	..	..	8	1,476	9·67
„ 13th „	205	109	2	..	..	2	532	9·75
85th Regiment	223	150	5	..	1	6	678	26·90
96th „	584	275	5	2	..	7	471	11·98
Cape Mounted Rifles ..	725	674	5	4	..	9	930	12·41

The admissions into hospital have, as in 1862, been remarkably high in the 11th Regiment quartered in Cape Town. The diseases which have contributed chiefly to this result have been venereal, continued fevers, and affections of the skin, particularly boils.

The diseases by which the admissions and deaths among the troops were occasioned are detailed in Abstract No. XX. of Appendix. The following Table shows the influence of the different classes upon the health.

Cape of Good Hope.

Order.	Diseases.	1863.						1859–62.*	
		Mean Strength, 4,297.						Ratio per 1,000 of Mean Strength.	
		Admitted.	Deaths.			Ratio per 1,000			
			At Cape.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	1,046	13	..	13	243·4	3·02	283·0	2·17
2	Enthetic " ..	1,117	..	..	..	260·0	..	182·2	·06
3	Dietic " ..	85	1	..	1	19·8	·23	10·8	·53
4	Parasitic " ..	20	..	..	..	4·7	..	14·5	..
	Class II.								
1	Diathetic Diseases ..	22	..	..	..	5·1	..	2·9	·12
2	Tubercular " ..	38	8	1	9	8·8	2·09	9·0	1·18
	Class III. Diseases of the—								
1	Nervous System ..	99	3	1	4	23·0	·93	24·4	1·35
2	Circulatory " ..	47	9	..	9	10·9	2·09	22·4	1·58
3	Respiratory " ..	127	4	..	4	29·6	·93	57·1	·94
4	Digestive " ..	160	1	..	1	37·2	·23	46·4	·94
5	Urinary " ..	8	..	..	..	1·9	..	2·0	·18
6	Reproductive " ..	42	..	..	..	9·8	..	9·3	..
7	Locomotive " ..	29	..	..	..	6·7	..	4·5	..
8	Integumentary " ..	419	..	..	..	97·5	..	102·9	..
	Class IV.								
4	Diseases of Nutrition ..	3	..	..	..	·7	..	·6	..
	Class V.								
1	Accidents	337	5	..	5	78·4	1·16	87·7	1·52
3	Homicide	..	1	..	1	..	·23	..	·06
4	Suicide	..	1	..	1	..	·23	·1	·18
5	Execution	..	..	..	..	..	..	..	·06
6	Corporal Punishment ..	17	..	..	..	4·0	..	3·7	..
	Diseases not specified ..	..	..	..	..	..	..	9·6	..
	Total	3,616	46	2	48	841·5	11·14	873·1	10·87

There has been a decrease in the prevalence of miasmatic diseases, and of those of the circulatory and digestive systems, but an increase in enthetic, dietic, and tubercular diseases. The mortality by miasmatic and tubercular diseases, and those of the circulatory system, has increased, but there has been a decrease in the other classes.

MIASMATIC DISEASES.—The influence of the chief groups comprised in this class was as follows :—

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* The 59th Regiment in 1859 has been omitted in preparing this Table, for reasons which were fully detailed in the Report for that year

Cape of Good Hope.

Diseases.	Admitted	Died.	Annual Ratio per 1,000 of Strength.			
			1863.		1859–62.	
			Admitted	Died.	Admitted	Died.
Eruptive Fevers	..	..	..	..	2·2	·06
Paroxysmal "	17	1	4·0	·23	8·7	..
Continued "	150	7	34·9	1·62	48·9	1·17
Dysentery, Diarrhœa, and Cholera	193	5	44·9	1·16	44·7	·94
Sorethroat and Influenza ..	125	..	29·1	..	20·0	..
Ophthalmia	388	..	90·3	..	91·0	..
Rheumatism	135	..	31·4	..	40·9	..

The reduction in this class of diseases has taken place chiefly in fevers and in rheumatism. There has been a marked increase in the admissions by sorethroat and influenza, which was caused by the prevalence of the latter disease as an epidemic throughout the colony in April and May. The civil population was very generally affected by it.

Ophthalmia.—The admissions by this disease amounted to exactly the average of the four preceding years, but were one-fourth lower than in 1862. The reduction may have been to some extent due to the removal from the Command of two of the regiments in which it was very prevalent—the 13th to the Mauritius, and the 85th to England. A detailed report, by Deputy Inspector-General Lawson, upon the prevalence of ophthalmia at the Cape, will be found at page 340 of this volume.

Enthetic Diseases have been greatly above the average, but the excess has been due to the 11th Regiment, at Cape Town, in which upwards of one-half of all the admissions occurred. In that corps 575 cases were admitted during the year, being in the ratio of 695 per 1,000 of the strength, while in the rest of the force there were only 542 cases, or in the ratio of 156 per 1,000. But even this scarcely represents the true state of matters at Cape Town, for two companies were detached, one at Port Elizabeth, and the other at Simon's Town, and in these only 28 cases occurred. The admissions at Cape Town, therefore, were 547 in the head-quarters and 8 companies, or about 80 per cent. of the strength.

Dietic Diseases were considerably above the average. The increase was chiefly due to scurvy, of which 22 cases were admitted, and the prevalence of which probably depended on the want of sufficient vegetables in the early part of the year, in consequence of the long-continued drought. Measures were taken by the authorities to encourage the formation of soldiers' gardens, and considerable supplies were subsequently obtained from them at a cheap rate, when otherwise there would have been much difficulty in procuring them.

Diseases of the Circulatory System have been considerably under the previous average, but the deaths have been more numerous. Of the nine deaths, four were the result of valvular disease of the heart, four of aneurism, and one of pericarditis.

Violent Deaths.—The homicidal death was that of a man of the Cape Mounted Rifles, who was murdered by Kaffirs.

Section II.

On the Extent of Invaliding.

During the year there were 31 men sent home from the Cape as invalids recommended for discharge from the service, and 45 for change of climate. The causes of invaliding are stated in Abstract No. XXI. of Appendix, of which the following is a classified summary.

Cape of Good Hope

Diseases.	Number sent Home.	
	Recommended for Discharge.	For Change of Climate.
Dysentery	..	2
Ophthalmia	5	11
Rheumatism	2	8
Venereal	..	4
Tubercular Diseases	1	1
Diseases of the—		
Nervous System	8	4
Circulatory "	3	12
Respiratory "	..	4
Digestive "	2	1
Locomotive "	3	..
Integumentary "	1	1
Diseases of Nutrition	4	1
Accidents and Violence	1	1
Worn Out	1	..
Total	31	45
Annual Ratio per 1,000 of Mean Strength 1863	7·11	10·47
Annual Ratio per 1,000 of Mean Strength 1861-2	15·03	11·96

The proportion has been under the average of the two preceding years. Ophthalmia and diseases of the nervous and circulatory systems have been the chief causes of invaliding.

There were 8 invalids finally discharged the service at the Cape, and 89 at the invalid depôt at home, making a total of 97, or in the ratio of 22·57 per 1,000 of the strength. The classes of diseases for which they were discharged were as follows:—

Diseases.	Discharged.	
	At the Cape.	In England.
Dysentery	..	2
Ophthalmia	..	19
Rheumatism	3	7
Venereal	..	7
Diathetic Diseases	..	2
Tubercular "	1	8
Diseases of the—		
Nervous System	..	5
Circulatory "	1	16
Respiratory "	..	3
Digestive "	1	4
Urinary "	..	1
Reproductive "	1	..
Locomotive "	..	5
Integumentary "	..	1
Diseases of Nutrition	1	6
Accidents and Violence	..	3
Total	8	89
Annual Ratio per 1,000 of Mean Strength 1863	1·86	20·71
Annual Ratio per 1,000 of Mean Strength 1861-2	..	17·00

This Table shows the two chief causes of discharge from the service to have been ophthalmia and diseases of the circulatory system.

Section III.

Mean Daily Sick.

Cape of Good Hope.

The average number constantly non-effective from sickness during the year was 197, or 45·84 per 1,000 of the strength. The following are the results for 1863, compared with those for the three preceding years:—

	1863.	1860–62.
Ratio per 1,000 of Strength constantly Sick	45·84	46·04
	Days.	Days.
Average Sick time to each Soldier	16·73	16·80
Average duration of cases of Sickness	19·89	19·54

These results approximate so closely as to furnish no occasion for remark.

Section IV.

On the Influence of Age on the Mortality.

The following Table, framed from Abstract No. XXII. of Appendix, show the mortality by ages in quinquennial periods.

		Under 20	20–24	25–29	30–34	35–39	40 and upwards.
Ratio of Deaths per 1,000 living	1863 ..	..	7·60	12·76	20·11	50·00	111·11
	1859–62	5·77	9·65	9·04	12·61	14·52	29·76

The numbers living above 35 are too few to warrant any deductions from them. The results under that age do not differ materially, on the average of several years, from those of the troops serving at home.

VIII.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF MAURITIUS.

Section I.

Sickness and Mortality.

Mauritius.

In April the 11th Company Royal Engineers, and the 2nd Battalion 5th Regiment, proceeded to the Cape of Good Hope, having been relieved by the 25th Company Royal Engineers, and 1st Battalion 13th Regiment, from that colony.

The average strength of the troops during 1863 was 1,978 non-commissioned officers and men. The admissions into hospital were 1,288, and the deaths 26, of which 19 occurred in hospital, 3 out of hospital, and 4 among invalids, on their passage home and at the invalid depôt. These numbers give the proportion of 651 admissions, and 13·10 deaths, per 1,000 of mean strength.

The admissions and deaths were distributed in the several corps as follows:—

Mauritius.

	Average Annual Strength.	Admissions into Hospital.	Deaths.				Ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted.	Died.
Royal Artillery	228	178	3	..	2	5	781	21·93
Royal Engineers ..	158	130	1	2	..	3	823	18·99
2nd Batt., 5th Regiment.	230	141	3	..	1	4	613	17·39
„ 13th „ ..	560	391	6	..	..	6	698	10·71
„ 24th „ ..	801	447	6	1	1	8	558	9·99

The diseases by which the admissions into hospital and deaths were occasioned are stated in Abstract No. XX. of Appendix. The influence of the various classes of diseases is shown in the following Table.

Order.	Diseases.	Strength 1,978.				1863.		1859–62.	
			Deaths.			Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	At Mauritius.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	427	7	2	9	215·9	4·54	355·1	17·18
2	Enthetic „ ..	286	..	..	..	144·8	..	78·1	..
3	Dietic „ ..	25	1	..	1	12·6	·50	16·7	·14
4	Parasitic „ ..	6	..	..	..	3·0	..	10·1	..
	Class II.								
1	Diathetic Diseases ..	3	..	..	..	1·5	..	3·7	..
2	Tubercular „ ..	24	4	2	6	12·1	3·03	11·8	1·69
	Class III.								
	Diseases of the—								
1	Nervous System ..	24	2	..	2	12·1	1·01	25·3	1·13
2	Circulatory „ ..	25	1	..	1	12·6	·50	10·6	·56
3	Respiratory „ ..	73	2	..	2	36·9	1·01	61·6	·56
4	Digestive „ ..	76	..	..	..	38·4	..	88·6	1·41
5	Urinary „ ..	5	..	..	..	2·5	..	2·8	..
6	Reproductive „ ..	34	..	..	..	17·2	..	11·1	..
7	Locomotive „ ..	10	..	..	..	5·1	..	5·6	..
8	Integumentary „ ..	138	1	..	1	69·8	·50	136·4	..
	Class IV.								
4	Diseases of Nutrition	11	..	..	..	5·5	..	9·9	·14
	Class V.								
1	Accidents	114	1	..	1	57·6	·50	74·7	1·27
4	Suicide	1	3	..	3	·5	1·51	·4	·98
6	Corporal Punishment	6	..	..	..	3·0	..	3·5	..
	No appreciable disease	..	..	..	..	..	..	·7	..
	Diseases not specified	..	..	..	..	..	..	7·9	..
	Total ..	1,288	22	4	26	651·1	13·10	914·6	25·04

The admissions have been one-third, and the deaths one-half below the average of the four preceding years. The reduction in the former has been chiefly in miasmatic diseases, and also in those of the nervous, respiratory, digestive, and integumentary systems; that in the deaths has occurred in miasmatic diseases. If the results for 1862, when cholera prevailed as an

Mauritius. epidemic, be omitted, the reduction in the ratio of deaths will be found to be 4·3 per 1,000.

MIASMATIC DISEASES.—The admissions and deaths by the principal diseases in this class were as follows:—

Diseases.	Admitted.	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859–62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers.. ..	..	..	..	..	·6	..
Paroxysmal „	5	..	2·5	..	21·5	·70
Continued „	89	..	45·0	..	68·5	2·53
Dysentery, Diarrhœa, and Cholera	168	9	84·9	4·54	178·6	3·66
Spasmodic Cholera ..	..	..	..	..	25·0	9·56
Sorethroat and Influenza ..	10	..	5·0	..	10·3	..
Ophthalmia..	104	..	52·6	..	19·4	..
Rheumatism	39	..	19·7	..	24·8	..

Paroxysmal Fevers have been much below the average; but the high ratio of the preceding period was due to the prevalence of intermittent fever among the men of the Royal Artillery and 61st Regiment, which had previously been serving in China and India. They do not seem to be endemic diseases of this island.

Dysentery and *Diarrhœa* have not prevailed to half the extent they did during the four preceding years. Even omitting 1862 as an exceptional year, owing to the prevalence of cholera as an epidemic, the proportion has been greatly below the usual average. This may probably be to some extent explained in the same manner as the reduction in paroxysmal fevers.

Spasmodic Cholera, from which the troops suffered so severely in 1862, did not prevail during the year under review.

Ophthalmia was greatly in excess of the average, but this was due to the arrival in the island of the 2nd Battalion, 13th Regiment, from the Cape, where ophthalmia had prevailed to a great extent in it. Of 104 cases admitted into hospital at the Mauritius, 92 occurred in that regiment. As the disease continued to prevail after its arrival, though not to so great an extent as at the Cape, all the men suffering from, or who appeared predisposed to it, were sent to Flacq in the end of October, and this measure is stated to have been attended with marked benefit, but the results will be more appreciable in the next report.

ENTHETIC DISEASES have been much above the average; but no reason has been assigned for the increase.

DISEASES OF THE INTEGUMENTARY SYSTEM have been undergoing a marked diminution during the last three years, and they now amount to only one-third of the proportion in 1859. The difference is chiefly in boils and ulcers.

VIOLENT DEATHS.—In addition to one death from concussion of the brain, apparently the result of a blow, there were three by suicide; a gunner cut his throat, a sapper hanged himself, and a private of the 24th Regiment shot himself with his rifle.

Section II.

On the Extent of Invaliding.

There were 27 invalids sent home during the year recommended for discharge from the service, and 10 for change of climate, being respectively in the ratio of 13·65 and 5·06 per 1,000 of the strength. The classes of diseases

Mauritius,

which caused this invaliding are shown in the following Table, prepared from Abstract No. XXI. of Appendix.

	Invalids sent Home, Recommended—	
	For Discharge.	For Change of Climate.
Paroxysmal Fever	..	1
Dysentery and Diarrhœa	1	3
Rheumatism	..	1
Diathetic Diseases	1	..
Tubercular „	1	1
Diseases of the—		
Nervous System	5	..
Circulatory „	2	1
Respiratory „	2	..
Digestive „	2	2
Generative „	1	..
Locomotive „	2	..
Integumentary „	2	1
Diseases of Nutrition..	4	..
Accidents and Violence	1	..
"Worn Out"	3	..
Total	27	10
Ratio per 1,000 of Mean Strength 1863 ..	13·65	5·06
Ratio per 1,000 of Mean Strength 1861-62 ..	12·85	8·56

The number finally discharged the service at the invalid depôt was 23, or 11·63 per 1,000 of the strength, as follows:—

Dysentery	1
Rheumatism	1
Syphilis	1
Tumour	1
Scrofula	1
Epilepsy	1
Disease of Heart	2
Varicose Veins	1
Bronchitis	1
Hepatic Disease	2
Diseased Testicle	1
Inflammation of Joints	2
Contraction	2
Debility	6
Total	23
Ratio per 1,000 of Strength 1863 ..	11·6
Ratio per 1,000 of Strength 1859-62 ..	11·8

The proportion discharged in 1863 has been exactly the average of the four preceding years. There has been no prominent cause of invaliding except general debility, probably the effect of service in a tropical climate.

Section III.

Mean Daily Sick.

Mauritius.

The average number constantly sick during the year was 72, or 36·40 per 1,000 of mean strength. The following Table gives the usual deductions.

	1863.	1859–62.
Ratio per 1,000 of Strength constantly Sick	36·40	36·57
	Days.	Days.
Mean Sick-Time to each Soldier	13·29	13·35
Average duration of cases of Disease	20·40	14·59

This Table shows the mean daily sick and the sick-time to each soldier to have been almost exactly the same as the average of the four preceding years. The average duration of the cases of sickness has, however, been nearly one-half higher than formerly, a proof that the reduction in the admissions has taken place in those diseases which remain but a short time in hospital either from their trifling character, or, if severe, from the rapidity with which they run their course.

Section IV.

On the Influence of Age on the Mortality.

The mortality by ages is shown in the following Table. Two deaths which occurred in the 2nd Battalion 13th Regiment, at the Cape, prior to its embarkation for the Mauritius are included in the numbers.

Age on 1st January ..	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	..	..	26	..	117	5	62	..	14	..	5	..
Royal Engineers ..	4	..	23	..	107	1	20	2	9	..	2	..
2nd Bat. 13th Regt. ..	22	..	282	5	382	2	103	1	7	..	5	..
2nd Bat. 24th Regt. ..	8	..	536	7	199	1	68	..	12	..	..	..
Total	34	..	867	12	805	9	253	3	42	..	12	..
Ratio of Deaths per 1,000 of Strength:												
1863	..		13·84		11·18		13·33		..		..	
1859–62 ..	10·52		24·04		27·24		60·69		76·08		..	

IX.—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF CEYLON.

SECTION I.

Sickness and Mortality.

I.—WHITE TROOPS.

In the end of September the 2nd Battalion 25th Regiment from England relieved the 50th, which immediately embarked for service in New Zealand. There were no other changes in the composition of the Force serving in Ceylon. The average strength of the white troops during the year was 884; the admissions into hospital were 1,358, and the deaths 26; and of these 21 occurred in and 1 out of hospital, and 4 among invalids on their passage home. These numbers give the proportion of 1,536 admissions, and 29·41 deaths per 1,000 of the strength, both considerably above the ratio for 1862.

The diseases will be found stated in detail in Abstract No. XX. of Appendix. The following Table shows the influence of the different classes in causing sickness and mortality :—

	White Troops ..	Strength, 884.				Annual Ratio per 1,000.			
			Died.			1863.		1859–62.	
Orders.	Diseases.	Admitted.	At Ceylon.	Of Invalids.	Total	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases	608	17	..	17	687·8	19·23	586·7	9·15
2	Enthetic „ ..	237	..	..	..	268·1	..	232·9	·27
3	Dietic „ ..	22	..	..	..	24·9	..	18·0	·27
4	Parasitic „ ..	2	..	..	..	2·3	..	4·2	..
	Class II.								
1	Diathetic Diseases ..	1	..	..	..	1·1	..	4·4	·27
2	Tubercular „ ..	16	3	4	7	18·1	7·92	18·3	2·08
	Class III. Diseases of the—								
1	Nervous System..	27	1	..	1	30·5	1·13	53·5	2·50
2	Circulatory „ ..	5	..	..	..	5·6	..	16·6	·83
3	Respiratory „ ..	63	..	..	..	71·3	..	85·6	1·10
4	Digestive „ ..	77	..	..	..	87·1	..	176·7	3·88
5	Urinary „ ..	6	..	..	..	6·8	..	5·3	·27
6	Reproductive „ ..	24	..	..	..	27·2	..	15·0	..
7	Locomotive „ ..	4	..	..	..	4·5	..	4·4	·27
8	Integumentary „ ..	150	..	..	..	169·7	..	145·4	..
	Class IV.								
4	Diseases of Nutrition	1	..	..	..	1·1	..	8·0	..
	Class V.								
1	Accidents	113	..	..	..	127·8	..	126·9	1·39
4	Suicide	..	1	..	1	..	1·13	..	·27
6	Corporal Punishment	1	..	..	..	1·1	..	3·3	..
	Diseases not specified	..	..	..	..	..	..	7·5	..
	No appreciable disease	1	..	..	..	1·1	..	..	..
	Total	1,358	22	4	26	1536·1	29·41	1512·7	23·55

Ceylon. The admissions have been very slightly, and the deaths nearly 6 per 1,000 above the average of the four preceding years.

MIASMATIC DISEASES have been much more prevalent than usual, and the mortality by them has been more than double the average. The influence of the various groups composing this class has been as follows:—

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859–62.	
			Admitted	Died.	Admitted	Died.
Eruptive Fevers	4	1	4·5	1·13	·3	..
Paroxysmal „	79	2	89·4	2·26	120·8	·28
Continued „	83	3	93·9	3·39	44·0	..
Dysentery and Diarrhœa	219	9	247·7	10·18	217·2	6·37
Spasmodic Cholera	4	2	4·5	2·26	5·3	1·66
Sorethroat and Influenza	12	..	13·6	..	13·6	..
Ophthalmia	131	..	148·2	..	107·2	..
Rheumatism	71	..	80·3	..	74·8	.28

There has been a decrease in the prevalence of paroxysmal, but a marked increase of continued fevers.

Dysentery and Diarrhœa have been above the average, and very greatly in excess of the proportion in 1862. The increase has been attributed to the over-crowding of the men of the 2nd Battalion 25th Regiment in the transports; their being landed in Ceylon, without suitable clothing, in a very hot season; and to their being placed, at first, under canvas. Of the cases recorded 23 occurred in the Royal Artillery, 150 in the 25th, and 47 in the 50th Regiments. These numbers give a proportion of 245, 754, and 80 admissions per 1,000 of mean *annual* strength in these corps respectively. Diarrhœa was extremely prevalent in October and November at Colombo, and dysentery in November and December at Trincomalee. At the latter station eight of the deaths occurred.

Spasmodic Cholera did not prevail as an epidemic among the troops.

Ophthalmia.—The admissions by this disease were much above the average, but its prevalence was confined to the 50th Regiment, in which 121 cases occurred prior to its leaving the Island, the majority of them at Colombo.

TUBERCULAR DISEASES prevailed to exactly the same extent as formerly, but the mortality by them was doubled; the latter circumstance, however, may have been an accidental irregularity dependent on the small numbers under observation.

DISEASES OF THE DIGESTIVE SYSTEM.—The cases under this class have amounted to only half the usual average, the difference being chiefly in hepatic affections.

II. BLACK TROOPS.

The average strength of the Black Troops, consisting of Gun Lascars and the Ceylon Rifle Regiment, was 1,438. The admissions into hospital amounted to 1,422, and the deaths to 19, being in the ratio of 989 and 13·20 per 1,000 of mean strength, both rather under the results for 1862.

The diseases are detailed in Abstract No. XX. of Appendix; and the following Table shows the admissions and deaths by classes:—

Orders.	Black Troops	Strength 1,438.		Annual Ratio per 1,000 of Mean Strength.			
				1863.		1859–62.	
	Diseases.	Admitted	Died.	Admitted	Died.	Admitted	Died.
	Class I.						
1	Miasmatic Diseases ..	785	10	545·9	6·95	652·7	6·48
2	Enthetic „ ..	52	..	36·1	..	30·1	..
3	Dietic „ ..	2	..	1·4	..	1·0	..
4	Parasitic „ ..	96	..	66·7	..	68·5	..
	Class II.						
1	Diathetic Diseases ..	8	..	5·6	..	4·2	·50
2	Tubercular „ ..	5	2	3·5	1·39	3·3	1·00
	Class III. Diseases of the—						
1	Nervous System ..	24	2	16·8	1·39	9·5	·83
2	Circulatory „ ..	..	..	..	..	1·7	1·00
3	Respiratory „ ..	88	3	61·2	2·08	43·1	·66
4	Digestive „ ..	62	2	43·1	1·39	31·6	·50
5	Urinary „ ..	..	..	..	..	·2	..
6	Reproductive „ ..	22	..	15·3	..	5·8	..
7	Locomotive „ ..	..	..	..	..	·8	..
8	Integumentary „ ..	168	..	116·8	..	135·5	..
	Class IV.						
4	Diseases of Nutrition ..	2	..	1·4	..	1·0	·17
	Class V.						
1	Accidents	106	..	73·7	..	73·5	·50
4	Suicide	..	..	..	..	·2	·33
6	Corporal Punishment ..	1	..	·7	..	·5	..
	Diseases not specified ..	1	..	·7	..	1·3	..
	Total	1,422	19	988·9	13·20	1064·5	11·97

The admissions have been under and the deaths above the average of the four preceding years.

MIASMATIC DISEASES.—The admissions by this class have been much below the average, but there has been no corresponding reduction in the deaths. The principal diseases comprised in this class have prevailed as follows :—

Diseases.	Admitted	Died.	Ratio per 1,000 of Mean Strength.			
			1863.		1859–62.	
			Admitted	Died.	Admitted	Died.
Eruptive Fevers	25	1	17·4	·69	10·0	..
Paroxysmal „	493	2	342·8	1·39	390·6	1·16
Continued „	4	..	2·8	..	60·4	·33
Dysentery and Diarrhœa ..	114	6	80·0	4·16	51·7	2·00
Spasmodic Cholera	1	1	·7	·69	4·2	2·99
Sorethroat and Influenza ..	5	..	3·5	..	2·2	..
Ophthalmia	58	..	40·3	..	73·5	..
Rheumatism	69	..	48·0	..	46·4	..

Eruptive Fevers—Small-pox prevailed in the Ceylon Regiment, both at Colombo and Kandy. Twelve cases, of which one proved fatal, were returned as small-pox, and 11 as modified small-pox (*varioloides*) during the year. The

Ceylon. men affected are all stated to have borne marks of vaccination. The disease was prevalent among the civil population.

Fevers were considerably under the average, particularly those of the continued type.

Dysentery aud Diarrhœa were more prevalent than usual, and the rate of mortality was double the average.

Ophthalmia prevailed to little more than half the previous extent.

ENTHETIC DISEASES are a source of very little sickness; but, as formerly explained, this arises from the large proportion of married men in the corps.

PARASITIC DISEASES continue very high. The whole of the admissions were from itch, which is very common among the native population.

The other diseases do not seem to require comment.

SECTION II.

On the extent of Invaliding.

During the year 2 invalids were sent home recommended for discharge, and 65 for change of climate. The diseases which occasioned this invaliding are stated in Abstract No. XXV. of Appendix, of which the following is a classified summary :—

Diseases.	Recommended—	
	For Discharge.	For Change of Climate.
Dysentery	..	1
Ophthalmia	..	21
Rheumatism	..	6
Venereal Diseases..	..	6
Tubercular Diseases	1	7
Diseases of the—		
Nervous System	..	3
Respiratory "	..	1
Digestive "	..	12
Reproductive "	..	1
Diseases of Nutrition	..	6
Accidents and Violence	1	1
Total	2	65
Ratio per 1,000 of Mean Strength { 1863	2·30	74·71
1860–62.. ..	15·57	38·95

The invaliding has been considerably above the average, the chief causes being ophthalmia and hepatic affections, but the excess being due to the former.

The number finally discharged the service at the Invalid Depôt was 31. There were 17 of the black troops discharged in Ceylon on account of disease, in addition to 41 returned under the head of old age. The following Table, compiled from Abstract No. XXV. of Appendix, shows the classes of diseases which were the causes of discharge.

	White Troops Discharged at Invalid Depôt.	Black Troops Discharged in Ceylon.
Ophthalmia	7	..
Rheumatism	1	2
Diathetic Diseases	1	2
Tubercular Diseases	6	1
Diseases of the—		
Nervous System	2	2
Circulatory "	4	..
Respiratory "	3	2
Digestive "	4	..
Reproductive "	..	3
Locomotive "	2	..
Integumentary "	..	3
Diseases of Nutrition	..	2
Accidents and Violence	1	..
Total	31	17
Ratio per 1,000 of Strength 1863	35·1	11·8
Ratio per 1,000 of Strength 1860-62	15·2	19·5

The proportion discharged of the white troops has been more than double the average. Ophthalmia and consumption have been the two most prominent causes. The proportion of black troops discharged has been little more than half the average.

SECTION III.

On the Mean Daily Sick.

The average number constantly sick of the white troops was 64, and of the black troops 54. The following Table gives the usual deductions from these numbers.

	White Troops.		Black Troops.	
	1863.	1859–62.	1863.	1859–62.
Ratio per 1,000 of Strength constantly sick	72·40	72·85	37·55	31·60
	days.	days.	days.	days.
Average sick time to each Soldier	26·43	26·59	13·71	11·53
Average duration of cases of Sickness	17·20	17·58	13·86	10·83

The results for the white troops correspond very closely with the average. Among the black troops there has been an increase in the proportion constantly sick, and in the duration of the cases. The decrease in the admissions into hospital would appear, therefore, to have taken place chiefly in trifling cases, or in diseases which run their course rapidly.

SECTION IV.

Influence of Age on the Mortality.

Ceylon. In consequence of the arrival of the 25th and departure of the 50th Regiment in the middle of the year, the information regarding the mortality at different ages among the white troops must be confined to the Royal Artillery. The following Table shows the strength and deaths at the different ages in quinquennial periods.

Ages	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards	
WHITE TROOPS.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	3	..	17	1	64	2	14	1	4	..	..	..
Ratio per 1,000 of Strength:												
1863	..		58·82		31·25		71·43		..		..	
1860-62 ..	..		13·40		22·94		24·61		46·87		200·00	
BLACK TROOPS.												
Ceylon Rifles	160	1	157	3	188	1	285	5	229	3	108	3
Gun Lascars	4	..	40	..	51	2	33	1	26	..	23	..
Total	164	1	197	3	239	3	318	6	255	3	131	3
Ratio per 1,000 of Mean Strength:												
1863	6·09		15·23		12·55		18·87		11·76		22·90	
1860–62 ..	7·62		9·74		16·99		6·55		21·92		11·86	

The number of white troops in 1863 is too small to justify any deductions from the results, and even for the previous period the same remark applies to the mortality from 35 upwards.

In the mortality of the black troops there is a great irregularity at the age 30-34, which may probably disappear when more extensive data are accumulated.

X.—ON THE HEALTH OF THE TROOPS IN THE AUSTRALASIAN COLONIES.

1. *Sickness and Mortality.*

I. AUSTRALIA AND TASMANIA.

Australia. In September the Head Quarters of the 1st Battalion 12th Regiment and a detachment of the 40th Regiment embarked for New Zealand, leaving a force of about 370 in Australia and Tasmania. The average strength for the year was 788, the admissions into hospital were 487, and the deaths 16, of which 3 occurred out of hospital and 2 among invalids while awaiting their discharge in England. The proportion of admissions to strength was 618 and

Australia.

of deaths 20·31 per 1,000. The diseases by which the admissions and deaths were occasioned are detailed in Abstract No. XXIII. of Appendix, from which the following classified summary has been framed.

Average Strength .. 788		Australia and Tasmania.							
		1863.						1859–62.	
			Died.			Ratio per 1,000.		Ratio per 1,000.	
Orders.	Classes of Diseases.	Admitted.	In the Colony.	Of Invalids.	Total Deaths.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	187	2	..	2	173·9	2·54	226·9	2·13
2	Enthetic „ ..	51	..	..	..	64·7	..	120·9	..
3	Dietic „ ..	14	1	..	1	17·8	1·27	23·8	..
4	Parasitic „ ..	7	..	..	..	8·9	..	1·3	..
	Class II.								
1	Diathetic Diseases ..	3	..	..	..	3·8	..	5·5	·42
2	Tubercular „ ..	9	6	2	8	11·4	0·15	17·6	4·67
	Class III. Diseases of the—								
1	Nervous System	21	1	..	1	26·6	1·27	23·6	2·13
2	Circulatory „	8	2	..	2	10·2	2·54	13·0	2·34
3	Respiratory „	47	1	..	1	59·6	1·27	52·1	1·06
4	Digestive „	42	..	..	..	53·3	..	46·1	·64
5	Urinary „	5	..	..	..	6·3	..	4·2	·64
6	Reproductive „	4	..	..	..	5·1	..	1·3	..
7	Locomotive „	2	..	..	..	2·5	..	2·8	..
8	Integumentary „	53	..	..	..	67·3	..	70·6	..
	Class V.								
1	Accidents	81	1	..	1	102·8	1·27	99·2	1·06
4	Suicide	..	..	..	..	..	..	..	·21
6	Corporal Punishment	2	..	..	..	2·5	..	1·9	..
	Diseases not specified	..	..	..	..	..	..	14·0	·21
	No appreciable Disease	1	..	..	..	1·3	..	·9	..
	Total	487	14	2	16	618·0	20·31	725·7	15·51

The admissions into hospital have been under the previous average, but the deaths have been one-third above it, though rather lower than the ratio in 1862. The decrease in the admissions has been chiefly in the miasmatic and venereal, the increase in the deaths in tubercular diseases.

MIASMATIC DISEASES.—The prevalence of the chief groups composing this class has been—

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Strength.			
			1863.		1860–62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	..	..	..	..	1·3	..
Paroxysmal „	5	..	6·3	..	3·4	·21
Continued „	22	2	27·9	2·54	21·2	1·06
Dysentery, Diarrhœa, and Cholera	24	..	30·5	..	43·4	·64
Sorethroat and Influenza ..	30	..	38·1	..	49·9	·21
Ophthalmia	20	..	25·4	..	47·2	..
Rheumatism	25	..	31·7	..	51·0	..

Australia. The reduction in the admissions has taken place in all the groups except paroxysmal and continued fevers, which have been above the previous average.

ENTHETIC DISEASES have been little more than half as prevalent as before, a result which may probably have depended on the number of married men left with the detachments in Australia when the 12th and 40th Regiments proceeded on active service to New Zealand.

TUBERCULAR DISEASES, though less prevalent, have given rise to a much higher mortality than formerly. This has probably been the result of the selection of the weakly men, and those least fitted for active service, to remain in this colony when a large portion of the force was sent to New Zealand.

II. NEW ZEALAND.

New Zealand. In July the 2nd Battalion 18th Regiment arrived from England; in October the Head Quarters of 1st Battalion 12th Regiment arrived from Australia, and joined the wing previously serving in this Command, and at the same time a detachment of the 40th joined from Tasmania. In the middle of November the 50th Regiment arrived from Ceylon, and in December the 43rd Regiment from Calcutta.

The average strength of the troops serving in the colony during the year was 5,779 non-commissioned officers and men; there were 3,287 admissions into hospital, 43 deaths in hospital, 81 out of hospital, and 6 among invalids, making a total mortality of 130. These numbers show the admissions to have been in the ratio of 569 and the deaths 22·49 per 1,000 of the strength.

The sickness and mortality in the different corps were as follows:—

Corps.	Average Annual Strength.	Admissions into Hospital.	Deaths.				Ratio per 1,000.	
			In Hospital.	Out of Hospital.	Of Invalids.	Total.	Admitted	Died.
Royal Artillery.. ..	274	124	4	8	..	12	452·56	43·79
„ Engineers ..	69	23	1	1	1	3	333·33	43·48
1st Batt. 12th Regiment	389	175	1	6	1	8	449·87	20·56
2nd Batt. 14th „	1,094	620	7	7	1	15	566·73	13·71
2nd Batt. 18th „	401	309	4	9	..	13	640·93	32·42
40th Regiment.. ..	677	380	5	13	..	18	561·30	26·59
57th „	906	489	11	10	2	23	539·74	25·38
65th „	918	478	5	23	1	29	520·70	31·59
70th „	791	501	4	3	..	7	633·38	8·85

We have omitted from this Table the 43rd and 50th Regiments because they arrived in the Command so near the close of the year that no satisfactory deductions could be drawn from their numbers. Only one death occurred in each of these corps.

It will be observed that in none of the regiments serving in the Command have the admissions been equal to two-thirds of the strength, an extremely low proportion, particularly when it is considered that for eight months a great part of the force was engaged in field service, and that the men in quarters were, from unavoidable circumstances, frequently much crowded. The high rate of mortality was, in most of the corps, due to the casualties of war.

The causes of the admissions into hospital and deaths are fully detailed in Abstract No. XXIII. of Appendix, from which the following classified summary has been prepared.

New Zealand.

	Average Strength ..	5,779.				Ratio per 1,000 of Mean Strength.			
			Deaths.			1863.		1859–62.	
Orders.	Diseases.	Admissions.	In New Zealand.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
	Class I.								
1	Miasmatic Diseases ..	1,101	7	..	7	190·5	1·21	205·4	1·06
2	Enthetic ,, ..	95	..	..	..	16·5	..	29·5	..
3	Dietic ,, ..	63	..	..	..	10·9	..	10·7	·60
4	Parasitic ,, ..	103	..	..	..	17·8	..	12·9	..
	Class II.								
1	Diathetic Diseases ..	24	..	..	..	4·2	..	5·5	·23
2	Tubercular ,, ..	38	7	3	10	6·5	1·73	8·2	2·04
	Clas III. Diseases of the—								
1	Nervous System ..	114	6	1	7	19·7	1·21	21·9	·60
2	Circulatory ,, ..	33	6	..	6	5·7	1·04	7·2	·98
3	Respiratory ,, ..	245	5	..	5	42·4	·86	64·4	·76
4	Digestive ,, ..	144	3	1	4	24·9	·69	32·9	·68
5	Urinary ,, ..	16	2	..	2	2·8	·35	2·1	·23
6	Reproductive ,, ..	46	..	..	..	8·0	..	4·2	..
7	Locomotive ,, ..	16	..	..	..	2·8	..	2·8	..
8	Integumentary ,, ..	391	..	..	..	67·6	..	81·2	·23
	Class IV.								
4	Diseases of Nutrition ..	3	..	..	..	·5	..	·5	..
	Class V.								
1	Accidents	526	16	..	16	91·0	2·77	86·3	1·44
2	In Battle..	127	72	..	72	21·9	12·46	10·2	4·16
3	Homicide	1	..	..	..	·2	..	·1	·08
4	Suicide	..	..	..	..	..	..	·2	..
5	Execution	..	..	..	..	..	..	..	·08
6	Corporal Punishment ..	201	..	..	..	34·8	..	3·4	..
	Diseases not specified ..	..	..	1	1	..	·17	5·5	·08
	Malingering	..	..	..	..	..	..	·1	..
	Total	3,287	124	6	130	568·7	22·49	595·2	13·25

The admissions have been a little below the average of the four preceding years, but the deaths greatly in excess of it. The increase in the latter, however, has been entirely due to the casualties of war, for if those in action and from wounds be deducted, the proportion is almost identical with the average.

Miasmatic Diseases have been slightly under the average. The influence of the chief groups of diseases in this class has been as follows :—

New Zealand.

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Strength.			
			1863.		1859–62.	
			Admitted.	Died.	Admitted.	Died.
Paroxysmal Fevers	15	..	2·6	..	7·7	..
Continued „	81	4	14·0	·69	17·3	·53
Dysentery, Diarrhœa, and Cholera	287	2	49·7	·35	44·2	·53
Sorethroat and Influenza ..	137	..	23·7	..	36·5	..
Ophthalmia	369	..	63·9	..	50·3	..
Rheumatism	136	..	25·5	..	36·9	..

There has been a slight increase in the prevalence of dysentery and diarrhœa, and of ophthalmia, but a reduction in all the other groups. The cases of ophthalmia occurred chiefly in the 14th, 40th, 65th, and 70th Regiments, in which the admissions were 63, 84, 69, and 78. The surgeon of the 40th states that after the removal of the regiment from Auckland the disease abated, and he attributes its prevalence in the regiment to the defective barrack accommodation there.

Enthetic Diseases have been extremely low, a result no doubt attributable to the special circumstances in which the troops were placed on field service.

Accidents and Violence.—During the year there were 62 men killed in action, and 10 died of their wounds, making a total loss by the hand of the enemy of 72, or 12·46 per 1,000 of the strength. In 120 cases of wounds received in action, which were admitted into hospital, the regions of the body wounded were as follows:—

	Admitted.	Died.
Head	17	3
Face	8	..
Neck	4	1
Chest	7	2
Abdomen	7	1
Back and Spine	13	1
Upper Extremities	29	..
Lower „	33	1
Direct injury to the large arteries	1	1
Penetration or perforation of the large joints ..	1	..

In addition to the men thus killed on service there were 12 deaths by drowning, 3 by fracture, and 1 by gunshot, the man having been accidentally shot by a sentry.

Corporal Punishment was inflicted in 201 instances, or in the ratio of 35 per 1,000 of the strength. This very high proportion was the consequence of the troops being employed on field service, where it was impossible to carry out sentences of imprisonment, the other usual secondary punishment.

SECTION II.

On the Extent of Invaliding.

During the year there were 16 invalids sent home from Australia recommended for discharge from the service and 12 for change of climate, and from New Zealand, 49 for discharge and 45 for change. The disabilities for which they were sent home are detailed in Abstract No. XXIV. of Appendix, of which the following is a classified summary.

Diseases.	Australia.		New Zealand.	
	Recommended for Discharge	Recommended for Change of Climate.	Recommended for Discharge	Recommended for change of Climate.
Ophthalmia	2	..	8	14
Diarrhœa	..	1	..	..
Rheumatism	4	1	4	1
Venereal	..	..	1	..
Diathetic Diseases	..	..	1	..
Tubercular „	..	5	9	7
Diseases of the—				
Nervous System	4	1	11	5
Circulatory „	2	1	5	2
Respiratory „	..	..	4	2
Digestive „	1	..	1	3
Urinary „	..	..	..	2
Reproductive „	..	..	..	1
Locomotive „	1	1	..	1
Integumentary „	1	..	4	..
Diseases of Nutrition	..	..	..	1
Accidents, &c.	..	..	..	1
Wounds in Battle	..	..	1	5
Disability not specified	1	2	..	..
Total	16	12	49	45
Ratio per 1,000 of Mean Strength .. .. 1863..	20·30	15·23	8·48	7·79
1861–2	43·00	..	16·77	3·95

The proportion sent home as invalids has been rather below the average from both Commands. Ophthalmia has been the most prominent cause of invaliding from New Zealand, and next to it tubercular diseases and those of the nervous system, chiefly epilepsy and insanity.

There were 35 invalids finally discharged the service in Australasia, and 87 at the invalid depôt in England, making a total of 122, or in the proportion of 18·58 per 1,000 of the strength. The following Table, framed from Abstract No. XXIV. of Appendix, shows the classes of diseases for which they were discharged.

Australasia.

	Discharged as Invalids.	
	In Australasia.	In England.
Continued Fevers	..	1
Dysentery and Diarrhœa	..	2
Ophthalmia	2	16
Rheumatism	6	8
Venereal Diseases	1	3
Dietic "	..	1
Diathetic "	..	1
Tubercular "	..	12
Diseases of the—		
Nervous System	3	11
Circulatory "	5	9
Respiratory "	4	7
Digestive "	1	5
Locomotive "	5	3
Integumentary "	2	..
Diseases of Nutrition	3	4
Accidents	1	3
Wounds in Battle	2	1
Total	35	87
Ratio per 1,000 of Mean Strength 1863	5·33	13·25
1859–62	..	10·77

The number discharged has been a little in excess of the average of the four preceding years. Ophthalmia has been the most prominent of the causes assigned for discharge.

Section III.

Mean Daily Sick.

The average number constantly sick in Australia during 1863 was 22, and in New Zealand 175. The following Table gives the usual information deduced from these numbers.

	Australia and Tasmania.		New Zealand.	
	1863.	1859–62.	1863.	1861–2.
Ratio per 1,000 constantly sick ..	27·92	35·82	30·28	31·33
	Days.	Days.	Days.	Days.
Average sick time to each soldier ..	10·19	13·07	13·91	11·44
Average duration of cases	16·49	17·74	19·43	19·57

The mean daily sick in Australia has been considerably under the average, and in New Zealand also it has been slightly under the ratio of the two preceding years. The circumstance that the force in New Zealand, a large portion of which was on field service during great part of the year, had on the average only 3 per cent. constantly non-effective from sickness, and a rate of mortality amounting to only 1 per cent., exclusive of the casualties of war, is a remarkable proof of the great salubrity of the climate.

Section IV.

On the Influence of Age on Mortality.

Australasia.

The influence of age on the mortality of the troops serving in Australasia is shown in the following Table, framed from Abstract No. XXVI. of Appendix.

		Under 20 Years.	20–24.	25–29.	30–34.	35–39.	40 and Upwards.
Ratio of deaths per 1,000 living ..	1863 ..	..	25·06	12·26	16·56	30·94	58·82
	1859–62	2·23	7·76	13·90	10·19	19·63	37·04

The very high rate of mortality at the period 20-24 has arisen principally from the great proportion of the men between those ages who fell in action. If these be deducted the ratio of mortality is as follows:—

		Under 20 Years.	20–24.	25–29.	30–34.	35–39.	40 and Upwards.
Ratio of deaths per 1,000..	1863 ..	..	8·77	3·92	6·31	14·06	25·21
	1859–62	2·23	7·13	13·55	9·63	17·18	37·04

IX.—ON THE HEALTH OF THE TROOPS SERVING IN CHINA.

Section I.

Sickness and Mortality.

China.

In the end of June, the 3rd Battery 13th Brigade Royal Artillery and the 31st Regiment embarked for England, and on the 9th of December the 2nd Battalion 20th Regiment arrived at Hong Kong from Calcutta. In the end of June also the wing of the 5th Bombay Native Infantry, which had been left at Shanghai in 1862, embarked for India.

The average strength of the white troops during the year was 2,464 non-commissioned officers and men, among whom there were 4,970 admissions into hospital and 135 deaths, of which 6 occurred out of hospital. There were also 13 deaths among invalids on their passage home and at the invalid depôt, which increase the total to 148. These numbers give the ratio of 2,017 admissions, and 60·06 deaths per 1,000 of mean strength, the former being about 170 per 1,000 higher, and the latter 39 per 1,000 lower than in 1862.

The average strength of the native or Asiatic force was 1,562; the admissions into hospital were 1,842, and the deaths 31. We have no information as to deaths among invalids sent from this force to India. These numbers show the admissions to have amounted to 1,179, and the deaths in China to 19·85 per 1,000 of the strength, which are both under the proportion among the same class of troops in 1862.

In accordance with the arrangements adopted in former reports we shall now submit the information respecting the health of the troops in South and North China separately.

I. WHITE TROOPS.

I. SOUTHERN CHINA.

China. The average strength in 1863 was 1,202; the admissions into hospital were 2,637, and the deaths in China 47; the former being in the ratio of 2,194, and the latter of 39·06 per 1,000. These are considerably in excess of the results of 1862.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. XXIII. of Appendix. The following Table shows the influence of the various classes of diseases.

	Strength	1,202.		Annual Ratio per 1,000.			
				1863.		1859–62.	
Order.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic Diseases	1,569	28	1305·3	23·29	1235·5	24·21
2	Enthetic „	276	..	229·6	..	464·8	..
3	Dietic „	110	1	91·5	·83	30·3	·36
4	Parasitic „	10	..	8·3	..	4·7	..
	Class II.						
1	Diathetic Diseases	3	..	2·5	..	5·1	..
2	Tubercular „	18	3	15·0	2·49	8·8	·95
	Class III. Diseases of the—						
1	Nervous System	30	3	24·9	2·49	32·5	2·37
2	Circulatory „	9	1	7·5	·83	18·4	·59
3	Respiratory „	85	2	70·7	1·66	105·0	1·66
4	Digestive „	139	2	115·6	1·66	117·3	2·26
5	Urinary „	3	..	2·5	..	1·8	·12
6	Reproductive „	27	..	22·5	..	6·2	..
7	Locomotive „	5	..	4·2	..	5·5	..
8	Integumentary „	140	1	116·5	·83	150·1	·12
	Class IV.						
4	Diseases of Nutrition.. ..	69	2	57·4	1·66	29·8	·71
	Class V.						
1	Accidents	144	4	119·8	3·32	93·7	1·66
3	Homicide	..	..	..	..	..	·12
4	Suicide	..	..	..	..	..	·12
6	Corporal Punishment ..	..	..	..	..	3·8	..
	Diseases not specified ..	..	..	..	..	31·6	·24
	Total.. ..	2,637	47	2193·8	39·06	2339·9	35·49

This Table shows the admissions to have been under and the deaths slightly above the average of the four preceding years. The decrease in the admissions has been chiefly in venereal diseases, but has also extended to the diseases of the respiratory and integumentary systems, while there has been an increase in dietic diseases in those of the reproductive system and of nutrition, and in accidents.

MIASMATIC DISEASES have been slightly in excess of the previous average. When subdivided they give the following results.

Diseases.	Admitted.	Died.	Annual Ratio per 1,000 of Strength.			
			1863.		1859-62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	..	..	..	..	·6	..
Paroxysmal „	807	3	671·4	2·49	571·2	9·26
Continued „	374	3	311·1	2·49	236·1	2·97
Dysentery and Diarrhœa ..	251	13	208·8	10·81	211·0	11·75
Spasmodic Cholera	10	8	8·3	6·66	2·6	2·37
Sorethroat and Influenza ..	25	..	20·8	..	15·6	..
Ophthalmia	50	..	41·6	..	109·2	..
Rheumatism	42	1	34·9	·83	75·1	..

There has been a considerable increase in the prevalence of *Paroxysmal* and *Continued Fevers*, and this is still more marked if the comparison be restricted to the results for 1862. The mortality by paroxysmal fevers, however, has been greatly under the average.

Cholera can scarcely be said to have prevailed as an epidemic in South China, only ten cases having been admitted into hospital, but of these eight proved fatal.

Ophthalmia and *Rheumatism* have both been much under the average.

ENTHETIC DISEASES have been only half as prevalent as on the average of the four preceding years. The decrease has been considerably more marked in the diseases usually grouped as syphilitic than in the gonorrhœal.

DIETIC DISEASES have increased very much. All the cases but three were recorded as intemperance (*ebriositas*).

DISEASES OF THE INTEGUMENTARY SYSTEM.—The decrease in the admissions by this class has been chiefly in cases of boils (*phlegmon*).

DISEASES OF NUTRITION have given rise to nearly twice the average number of admissions. They have been for the most part cases of atrophy, the consequence of repeated attacks of malarious fever.

II.—NORTH CHINA.

The white troops in North China occupied Shanghai, with a detachment at Taku. The average strength was 1,262 non-commissioned officers and men, among whom there were 2,333 admissions into hospital and 88 deaths, being in the ratio of 1,849 and 69·73 per 1,000. The sickness, therefore, has been much greater than in 1862, but the mortality has been almost exactly the same in the two years.

The following Table shows the influence of the various classes of diseases in producing this sickness and mortality. The details for 1863 are given in Abstract No. XXIII. of Appendix.

China.

Orders.	Diseases.	1863.				1861–62.	
		Strength, 1,562.		Ratio per 1,000.		Ratio per 1,000.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.						
1	Miasmatic Diseases ..	1,118	22	715·7	14·08	946·2	16·27
2	Enthetic „ ..	142	..	90·9	..	74·8	·82
3	Dietic „ ..	3	..	1·9	..	1·7	..
4	Parasitic „ ..	37	..	23·7	..	9·9	..
	Class II.						
1	Diathetic Diseases ..	16	..	10·2	..	10·9	·41
2	Tubercular „ ..	4	2	2·6	1·28	2·1	·62
	Class III. Diseases of the—						
1	Nervous System	39	..	25·0	..	15·5	·21
2	Circulatory „	..	..	..	..	·4	·41
3	Respiratory „	183	2	117·2	1·28	68·6	2·47
4	Digestive „	72	2	46·1	1·28	51·5	·82
5	Urinary „	4	..	2·6	..	1·4	..
6	Reproductive „	..	..	..	..	·4	·21
7	Locomotive „	3	..	1·9	..	1·2	·21
8	Integumentary „	109	..	69·8	..	65·5	..
	Class IV.						
4	Diseases of Nutrition.	35	3	22·4	1·93	9·7	2·68
	Class V.						
1	Accidents	76	..	48·7	..	66·2	·82
2	Battle	..	..	..	..	2·5	·21
3	Homicide	..	..	..	..	..	·21
4	Suicide	..	..	..	..	..	·21
5	Execution	..	..	..	..	..	·21
6	Corporal Punishment.	1	..	·6	..	1·2	..
	Diseases not specified	..	..	..	..	1·0	..
	Total ..	1,842	31	1179·3	19·85	1830·7	26·79

This Table shows a reduction both in admissions and deaths upon the results of the two preceding years. In the admissions it has occurred chiefly in miasmatic diseases and in accidents, while there has been an increase in venereal and parasitic diseases, and in those of the nervous and respiratory systems, and of nutrition.

Miasmatic Diseases have been much less prevalent, and have also been less fatal than before. The following results are obtained on subdividing the class into groups.

Diseases.	Admitted.	Died.	Ratio per 1,000 of Strength.			
			1863.		1861–62.	
			Admitted.	Died.	Admitted.	Died.
Eruptive Fevers ..	1	..	·6	..	3·1	·20
Paroxysmal „ ..	620	3	396·9	1·92	602·5	2·68
Continued „ ..	24	2	15·4	1·28	19·6	1·03
Dysentery and Diarrhœa	240	7	153·6	4·48	179·7	3·65
Spasmodic Cholera ..	56	10	35·8	6·40	9·7	3·30
Sorethroat and Influenza	2	..	1·3	..	3·9	..
Ophthalmia	13	..	8·3	..	10·9	..
Rheumatism	154	..	98·6	..	107·6	·41

China.

There has been a great decrease in *Paroxysmal Fevers*, and a less marked one in the prevalence of *Dysentery* and *Diarrhœa*, but the mortality by the latter diseases has amounted to only half the previous average. *Cholera*, though much less fatal than in 1862, was still the cause of a very high rate of mortality. As already stated, it prevailed as an epidemic at Shanghai during the months of July and August.

PARASITIC DISEASES have been much above the average; the excess was caused by the prevalence of itch in the 29th, and Guinea worm in the 22nd Bombay Native Infantry. Of twelve cases of the latter disease which were admitted into hospital eleven occurred in that corps.

DISEASES OF THE RESPIRATORY SYSTEM.—The admissions by this class of diseases has been very high, chiefly owing to the prevalence of bronchitis in the 29th and Head Quarters 5th Bombay Native Infantry at Shanghai. The troops at Hong Kong were comparatively exempt.

DISEASES OF NUTRITION furnished a larger proportion of cases than usual. They were almost all in the 22nd Bombay Native Infantry at Hong Kong, and returned under the heads of atrophy and debility, probably the result of repeated attacks of malarious fever.

SECTION II.

On the Extent of Invaliding.

There were 128 invalids of the white troops sent home to England during the year, and 31 of the Asiatic troops to India, being respectively in the ratio of 51·95 and 19·85 per 1,000 of the strength. The diseases for which they were invalided are stated in Abstract No. XXV. of Appendix, from which the following summary has been framed.

	White Troops sent as Invalids to England.	Asiatic Troops sent as Invalids to India.
Intermittent Fever	5	..
Dysentery	33	..
Ophthalmia	7	..
Rheumatism	2	6
Venereal Diseases	7	..
Parasitic „	..	1
Diathetic „	1	..
Tubercular „	7	1
Diseases of the—		
Nervous System	11	5
Circulatory „	3	..
Respiratory „	11	2
Digestive „	15	1
Urinary „	1	..
Locomotive „	..	2
Integumentary „	1	1
Diseases of Nutrition	24	12
Total	128	31
Ratio per 1,000 of Strength .. .. { 1863..	51·95	19·85
{ 1861–2	48·57	8·04

The invaliding from the European force has been very little above the average. The chief disabilities were dysentery and atrophy, the latter usually the result of repeated attacks of fever. The number sent to India of the

China. Asiatic troops was more than double the average of the two preceding years, and the chief causes of invaliding were atrophy and rheumatism.

Forty-two invalids from China were finally discharged the service at the invalid depôt, the following being the causes assigned—

Dysentery	9
Ophthalmia	5
Rheumatism	2
Secondary Syphilis	3
Anæmia	1
Tubercular Diseases	2
Diseases of the—	
Nervous System	2
Circulatory "	7
Respiratory "	4
Digestive "	2
Urinary "	1
Locomotive "	1
Integumentary "	1
Diseases of Nutrition	2
Total	42
Ratio per 1,000 of Strength, 1863	17·05
Ratio per 1,000 of Strength, 1861–62	22·68

The number finally discharged has been under the average of the two preceding years. The chief disabilities have been dysentery and diseases of the circulatory system. We have received no information respecting the number discharged of the Asiatic troops.

SECTION III.

Mean Daily Sick.

The mean daily sick of the white troops throughout the Command was 180, and of Asiatic troops, 77. These numbers furnish the following results.

	European Force.		Asiatic Force.	
	1863.	1861–2.	1863.	1861–2.
Ratio per 1,000 of strength constantly sick	73·05	73·53	49·30	49·04
	Days.	Days.	Days.	Days.
Average sick time to each soldier..	26·66	26·84	17·99	17·90
Average duration of cases..	13·25	15·16	15·26	13·45

These results very closely approximate the average of the two preceding years. The only marked difference has been in the duration of the cases in which there has been a reduction of nearly two days among the European troops, and an increase to the same extent in the Asiatic force.

SECTION IV.

On the Influence of Age on the Mortality.

The strength and deaths by ages in quinquennial periods are given in Abstract No. XXVII. of Appendix, of which the following is a summary.

China.

	Under 20.	20–24.	25–29.	30–34.	35–39.	40 and upwards.
Strength on 1st January..	15	800	706	273	103	4
Deaths during year ..	..	26	40	8	25	1
Ratio of deaths per 1,000 of Strength:						
1863	..	32·50	56·66	29·30	242·7	250·0
1861–2	6·10	49·46	84·59	80·35	144·0	21·4

The 31st and 20th Regiments having been in the Command during a portion of the year only are necessarily omitted.

XII. ON THE HEALTH OF THE TROOPS SERVING IN INDIA.

Section I.

Sickness and Mortality.

India. The average strength of the European troops serving in India in 1863 was 67,525 non-commissioned officers and men. The admissions into hospital among them amounted to 110,357, and the deaths to 1,442 in India, and 154 among invalids on their passage home or at the Invalid Depôt while awaiting their discharge, making a total of 1,596. The admissions, therefore, were in the proportion of 1,634, and the deaths of 23·64 per 1,000 of the mean strength. These results show a reduction in both the admissions and deaths compared with the proportion in 1862.

The following Table shows the admissions and deaths among the troops in each of the Presidencies:—

	Average Strength.	Admissions into Hospital.	Deaths.			Ratio per 1000 of Mean Strength.			
						1863.		1860–62.	
			In India.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.
Bengal	42,575	74,910	1,034	84	1,118	1,759	26·26	1,944	37·43
Madras	12,621	15,835	245	34	279	1,255	22·11	1,342	19·82
Bombay	12,329	19,612	163	36	199	1,591	16·14	1,844	27·15

This Table shows a reduction in the admissions into hospital in all the Presidencies, but most marked in Bombay. There has also been a very considerable reduction in the mortality in Bengal and Bombay, but a slight increase in Madras.

The diseases by which the admissions and deaths were caused are detailed in Abstract No. XXVIII of Appendix. The following Table shows the influence of the different classes of diseases:—

Order.	Diseases.	Bengal.								Madras.								Bombay.							
		Average Strength, 42,575.				Ratio per 1,000 of Mean Strength 1863.		Ratio per 1,000 of Mean Strength 1860-62.		Average Strength, 12,621.				Ratio per 1,000 of Mean Strength 1863.		Ratio per 1,000 of Mean Strength 1860-62.		Average Strength, 12,329.				Ratio per 1,000 of Mean Strength 1863.		Ratio per 1,000 of Mean Strength 1860-62.	
			Died.								Died.								Died.						
		Admitted.	In India.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.	Admitted.	In India.	Of Invalids.	Total.	Admitted.	Died.	Admitted.	Died.	Admitted.	In India.	Of Invalids.	Total.	Admitted	Died.	Admitted.	Died.
	Class 1.																								
1	Miasmatic Diseases ...	42,721	469	28	497	1,003·4	11·67	1,114·1	24·84	5,734	97	15	112	454·3	8·87	567·8	8·12	10,455	54	7	61	848·0	4·95	1,048·6	15·82
2	Enthetic „ ...	11,616	12	...	12	272·8	·28	341·1	·32	3,200	4	1	5	253·6	·40	269·0	·35	3,235	1	1	2	262·4	·16	317·3	·31
3	Dietic „ ...	433	16	...	16	10·2	·38	9·0	·05	245	1	...	1	19·4	·08	17·1	·12	310	3	...	3	25·1	·25	17·5	·19
4	Parasitic „ ...	347	...	...	...	8·2	...	6·4	...	113	...	...	...	8·9	...	8·7	...	125	...	...	...	10·1	...	12·2	...
	Class II.																								
1	Diathetic Diseases ...	208	8	...	8	4·9	·19	6·0	·22	64	1	1	2	5·1	·16	5·1	·18	134	3	...	3	10·9	·25	7·0	·19
2	Tubercular „ ...	472	93	22	115	11·1	2·70	11·2	2·48	239	22	7	29	18·9	2·30	15·7	1·88	97	13	9	22	7·9	1·78	9·5	1·53
	Class III. Diseases of the—																								
1	Nervous System ...	1,474	75	4	79	34·6	1·85	34·0	2·28	454	20	...	20	36·0	1·58	32·6	1·59	404	12	1	13	32·8	1·05	32·8	1·53
2	Circulatory „ ...	348	33	9	42	8·2	·99	10·2	·62	158	9	4	13	12·5	1·03	15·3	1·27	192	6	3	9	15·6	·73	11·5	·53
3	Respiratory „ ...	2,061	36	4	40	48·2	·94	56·5	1·04	610	9	2	11	48·3	·87	48·5	·59	548	12	2	14	44·5	1·13	51·4	·96
4	Digestive „ ...	5,794	160	9	169	136·1	3·97	140·3	3·85	1,652	45	3	48	130·9	3·80	130·0	3·41	1,382	39	9	48	112·1	3 89	122·1	3·64
5	Urinary „ ...	111	5	4	9	2·6	·21	2·3	·14	39	2	...	2	3·1	·16	2·3	·18	26	...	1	1	2·1	·08	2·9	·06
6	Reproductive „ ...	815	...	...	...	19·1	...	10·6	·02	243	...	...	...	19·2	...	12·1	...	171	...	...	...	13·9	...	8·2	...
7	Locomotive „ ...	271	2	1	3	6·4	·07	5·3	·03	68	...	...	...	5·4	...	4·6	·03	77	...	...	...	6·2	...	4·4	...
8	Integumentary „ ...	3,924	2	...	2	92·2	·05	108·2	·07	1,507	1	...	1	119·4	·08	106·7	·18	1,220	...	1	1	99·0	·08	102·1	·06
	Class IV.																								
4	Diseases of Nutrition	297	6	1	7	7·0	·16	8·3	·14	77	2	1	3	6·1	·24	5·4	·21	50	2	2	4	4·1	·33	4·9	·06
	Class V.																								
1	Accidents	3,655	53	1	54	85·8	1·27	74·3	·73	1,398	28	...	28	110·8	2·22	91·3	1·27	1,168	13	...	13	94·7	1·05	88·9	1·68
2	Battle	171	42	...	42	4·0	·99	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3	Homicide	...	...	...	...	...	...	...	·03	...	...	...	...	...	...	...	...	...	1	...	1	...	·08	...	...
4	Suicide	...	17	...	17	...	·40	·1	·20	...	4	...	4	...	·32	...	·06	3	4	...	4	·2	·33	...	·34
5	Execution	...	...	...	...	...	...	...	·01	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	·03
6	Corporal Punishment	49	...	...	...	1·1	...	1·0	...	30	...	...	...	2·4	...	1·4	...	15	...	...	...	1·2	...	1·1	...
	Diseases not specified	153	5	1	6	3·6	·14	5·6	·36	4	...	...	...	·3	...	8·5	·38	...	...	...	...	...	...	2·0	·22
	Total	74,910	1,034	84	1,118	1,759·5	26·26	1,944·5	37·48	15,835	245	34	279	1,254·6	22·11	1,342·1	19·82	19,612	163	36	199	1,590·8	16·14	1,844·4	27·15

India.

India. The reduction in the admissions in all the Presidencies has been chiefly in miasmatic diseases. In Bengal and Bombay there has also been a decrease in the amount of venereal. The marked decrease in the mortality in Bengal and Bombay has been in miasmatic diseases, while the increase in that of Madras has been due to miasmatic and tubercular diseases, and to accidents.

Miasmatic Diseases.—The following Table shows the relative prevalence of the principal groups comprised in this class:—

	Bengal.		Madras.		Bombay.		Ratio per 1,000 of Mean Strength.											
							Bengal.				Madras.				Bombay.			
							1863.		1860–2.		1863.		1860–62.		1863.		1860–62.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	52	10	6	..	10	2	1. 2	·23	3·4	·43	·5	..	1·0	·06	·8	·16	2·1	·28
Paroxysmal „	25,649	92	1,962	4	6,895	12	601·1	2·16	514·4	2·21	155·5	·32	182·8	·85	559·2	·97	577·3	2·24
Continued „	4,129	47	542	16	529	5	97·0	1·10	206·5	1·96	42·9	1·27	96·9	·82	42·9	·40	149·3	1·71
Dysentery and Diarrhœa	5,883	155	1,708	30	1,160	26	138·2	3·64	150·0	4·86	135·3	2·38	156·7	2·15	94·1	2·11	159·4	4·64
Spasmodic Cholera ..	232	157	119	47	12	8	5·4	3·69	24·3	14·53	9·4	3·72	7·1	3. 30	1·0	·65	9·6	6·07
Sorethroat and Influenza	891	..	162	..	239	..	20·9	..	21·4	·02	12·8	..	13·5	..	19·4	..	20·7	·03
Ophthalmia	2,019	..	305	..	646	..	47·4	..	69·4	..	24·2	..	33·7	..	52·4	..	59·9	..
Rheumatism	3,309	5	739	..	869	..	77·7	·12	74·2	·07	58·6	..	67·1	·03	70·5	..	62·3	..

Eruptive Fevers have been under the average in all three Presidencies. In Bengal, 44 of the admissions and all the deaths were from small-pox; 17 of the cases occurred at Allahabad and 14 at Cawnpore, the disease being very prevalent at both among the native population. The 77th Regiment at the former, and the 46th at the latter station, were the corps chiefly affected. *India.*

Paroxysmal Fevers have been more prevalent in Bengal, but less prevalent in the other two Presidencies than on the average of the three preceding years. There has been a marked reduction in the mortality by them in Bombay.

Continued Fevers have furnished a much lower proportion of admissions than formerly, and this improvement has extended also to the deaths in Bengal and Bombay.

Dysentery and Diarrhœa show a reduction in their prevalence, and, except in Madras, also in the amount of mortality.

Spasmodic Cholera has been greatly below the previous average in Bengal and Bombay, but slightly in excess of it in Madras. The disease, however, though less prevalent, still maintains its fatal character, the proportion of deaths to cases having been 1 in 1·71.

Ophthalmia continues to decrease in prevalence in Bengal and Madras; in Bombay the ratio of admissions, though under the average, does not show any reduction upon that of 1862.

ENTHETIC DISEASES have been considerably lower in Bengal and Bombay than formerly, but are still a source of great inefficiency, the admissions by them being equal to more than one-fourth of the whole force.

DIETIC DISEASES have been above the average in Bombay; the excess has been due to cases of scurvy, those admitted under the head of intemperance having been fewer than in 1862.

TUBERCULAR DISEASES have been more prevalent and fatal in Madras than formerly; in the other two Presidencies the results do not differ greatly from the previous average.

DISEASES OF THE INTEGUMENTARY SYSTEM.—There has been a considerable increase in the admissions by diseases of this class in Madras, chiefly cases of boils (*phlegmon*) and abscesses.

ACCIDENTS, VIOLENCE, &c.—In Bengal and Madras there has been a marked increase in the deaths by this class, the two principal causes being sunstroke and drowning. The cases of the former amounted to 128, and the deaths to 30, and the deaths by drowning were 41, including three reported as suicidal.

I. BENGAL.

The following Table shows the sickness and mortality at the different stations in the military divisions of this Presidency:— *Bengal.*

Bengal.

Military Divisions.	Stations.	Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per 1,100.	
					Admitted.	Died.
Presidency	Calcutta	755	1,369	34	1,813	45·01
	Barrackpore ..	301	587	7	1,950	23·26
	Dum Dum ..	632	979	12	1,549	18·99
Benares	Hazareebaugh ..	845	1,299	17	1,573	20·12
	Dinapore	1,080	1,611	15	1,492	13·89
	Benares	1,403	2,662	54	1,897	38·49
Saugor..	Saugor	1,068	2,161	23	2,024	21·49
	Jubbulpore ..	1,004	2,068	24	2,060	23·90
Gwalior	Morar	1,240	2,181	33	1,759	26·61
	Jhansi	1,078	1,929	12	1,789	11·13
Oude ..	Allahabad.. ..	1,071	1,766	99	1,649	92·44
	Cawnpore	1,170	1,514	35	1,294	29·91
	Seetapore and Roy Bareilly ..	919	971	8	1,057	8·71
	Lucknow	2,431	3,562	73	1,465	30·03
	Fyzabad	1,002	2,109	17	2,109	16·97
	Gondah	722	872	8	1,208	11·08
Rohilcund	Shahjehanpore ..	476	800	6	1,681	12·61
	Moradabad ..	393	529	3	1,346	7·63
	Bareilly	933	1,138	13	1,220	13·93
Meerut..	Futtyghur.. ..	592	686	5	1,159	8·45
	Agra	1,153	1,892	40	1,641	34·69
	Delhi..	1,165	2,780	36	2,386	30·90
	Meerut	1,856	1,542	29	831	15·62
	Muttra	484	1,015	7	2,097	14·50
	Roorkee	435	602	5	1,384	11·49
Sirhind	Umballa	1,684	2,414	20	1,434	11·88
	Dugshai	808	621	14	769	19·80
	Subathoo	793	654	22	825	27·74
	Jullundur	705	1,010	8	1,433	11·35
	Kussowlie	328	842	13	2,567	39·63
Lahore..	Meean Meer ..	1,193	1,514	19	1,269	15·93
	Umritsir	365	501	33	1,373	90·41
	Ferozepore ..	1,087	1,397	15	1,291	13·80
	Mooltan	1,100	2,744	20	2,495	18·18
	Sealkote	1,302	2,516	26	1,932	19·97
Peshawur	Rawul Pindee ..	1,566	3,493	24	2,231	15·33
	Nowshera	710	1,153	15	1,624	21·13
	Peshawur	1,931	7,631	43	3,952	22·24
	Fort Attock ..	47	158	3	3,362	63·84
	Camps: Troops on March and on Field Service ..	3,195	5,094	92	1,594	28·79
	Convalescent Stations and Depôt Hospitals ..	1,553	3,135	52	2,019	33·48

The admissions into hospital have ranged between 3,952 per 1,000 at Peshawur, and 769 at Dugshai, and the deaths between 92·44 per 1,000 at Allahabad, and 7·63 at Moradabad. The admissions have been greatly in excess of the average at Peshawur and Fort Attock, at Kussowlie, Mooltan, Delhi, Rawul Pindee, and Fyzabad. At all these stations the chief cause of the large amount of sickness has been fever. At Fyzabad diarrhœa also contributed, in a marked degree, to the admissions. At Peshawur, so prevalent were paroxysmal fevers, that in the 79th Regiment 2,560 cases occurred in an average strength of 1,000 men, and in the E Battery, 2nd Brigade Royal Artillery, 637 cases in an average of 153 men.

The high rate of mortality at Allahabad, Benares, Agra, Delhi, Lucknow, and Cawnpore, was caused by the prevalence of cholera, at Umritsir by an epidemic of dysentery, at Morar by dysentery and hepatitis, and at Subathoo by fever. The mortality at Calcutta is much above the average, but this is, in some degree at least, due to the deaths of men of regiments not stationed there, which have taken place while they were either *en route* to join their corps or awaiting an opportunity of embarking for England as invalids. *Bengal.*

We are unable to show the admissions by the different classes of diseases in each of the military divisions, but the following Table shows their influence on the mortality :—

Bengal.

Order.	Military Divisions ..	Deaths by each Class of Diseases.										Annual Ratio per 1,000 of Mean Strength.									
		Presidency.	Benares.	Saugor.	Gwalior.	Oude.	Rohilcund.	Meerut.	Sirhind.	Lahore.	Peshawur.	Presidency.	Benares.	Saugor.	Gwalior.	Oude.	Rohilcund.	Meerut.	Sirhind.	Lahore.	Peshawur.
	Class I.																				
1	Miasmatic Diseases :—																				
	Eruptive Fevers ..	1	1	1	..	7	..	..	..	..	..	·59	·30	·48	..	·95	..	..	..	..	..
	Paroxysmal " ..	3	3	8	1	13	2	11	7	14	15	1·78	·90	3·86	·43	1·78	1·11	1·93	1·63	2·77	3·53
	Continued " ..	3	6	1	5	1	..	6	14	4	5	1·78	1·80	·48	2·16	·14	..	1·05	3·24	·79	1·17
	Erysipelas	..	..	..	..	1	..	1	..	..	1	..	..	..	..	·14	..	·18	..	..	·24
	Dysentery and Diarrhœa	9	8	8	11	25	5	19	16	22	12	5·33	2·41	3·86	4·75	3·42	2·78	3·34	3·71	4·36	2·82
	Spasmodic Cholera ..	6	38	..	..	85	..	22	2	1	..	3·56	11·42	..	..	11·62	..	3·87	·46	·20	..
	Rheumatism	..	2	..	..	..	..	1	..	..	..	..	·60	..	..	..	..	·18	..	..	..
2	Enthetic Diseases ..	..	..	..	2	..	1	..	..	1	..	..	..	..	·86	..	·55	..	..	·20	..
3	Dietic " ..	2	..	..	1	6	3	4	2	2	2	1·18	..	..	·43	·82	1·67	·70	·46	·40	·47
	Class II.																				
1	Diathetic Diseases ..	..	1	..	..	..	1	..	2	..	1	..	·30	..	..	..	·55	..	·46	..	·24
2	Tubercular " ..	7	4	3	2	21	3	10	6	14	10	4·15	1·20	1·45	·86	2·87	1·67	1·76	1·39	2·77	2·35
	Class III.																				
	Diseases of the—																				
1	Nervous System ..	8	2	4	4	12	2	13	6	12	9	4·74	·60	1·93	1·73	1·64	1·11	2·29	1·39	2·38	2·11
2	Circulatory " ..	1	..	1	6	3	..	3	3	4	6	·59	..	·48	2·59	·41	..	·53	·70	·79	1·41
3	Respiratory " ..	..	1	3	3	14	..	3	2	5	2	..	·30	1·45	1·30	1·91	..	·53	·46	·99	·47
4	Digestive " ..	4	14	14	8	37	4	19	13	22	10	2·37	4·21	6·76	3·45	5·06	2·22	3·34	3·01	4·36	2·35
5	Urinary " ..	..	1	..	..	3	..	2	1	..	..	..	·30	..	..	·41	..	·35	·23	..	..
7	Locomotive " ..	1	..	..	..	..	..	..	..	..	..	·59	..	..	..	..	..	..	..	..	..
8	Integumentary " ..	1	..	..	..	..	..	..	..	..	..	·59	..	..	..	..	..	..	..	..	..
	Class IV.																				
4	Diseases of Nutrition ..	..	..	..	..	..	..	3	1	1	..	..	..	..	..	..	..	·53	·23	·20	..
	Class V.																				
1	Accidents..	6	4	2	2	9	..	2	1	8	12	3·56	1·20	·96	·86	1·23	..	·35	·23	1·60	2·82
4	Suicide	..	1	2	..	3	1	2	1	3	2	..	·30	·96	..	·41	·55	·35	·23	·59	·47
	Diseases not specified ..	1	..	..	..	..	..	1	..	..	..	·59	..	..	..	..	..	·18	..	..	..
	Total	53	86	47	45	240	22	122	77	113	87	31·40	25·84	22·67	19·42	32·81	12·21	21·46	17·88	22·40	20·45

Bengal.

It will be seen from the Table that the high rate of mortality in the Oude and Benares divisions was due to epidemic cholera.

Eruptive Fevers were the cause of only ten deaths, and of these seven occurred in the Oude division, all of them from small-pox.

Paroxysmal and Continued Fevers were a source of considerable mortality in the Sirhind, Peshawur, and Saugor divisions.

Dysentery and Diarrhœa, taken in conjunction with DISEASES OF THE DIGESTIVE ORGANS, were the most fatal group of diseases, with the exception of cholera. Combining them together, the proportion of deaths per 1,000 of strength which they occasioned in the different military divisions was as follows:—

DEATHS per 1,000 of Mean Strength by Dysentery, Diarrhœa, and Diseases of the Digestive System.

Presidency Division	7·70
Benares „	6·62
Saugor „	10·62
Gwalior „	8·20
Oude „	8·48
Rohilcund „	5·00
Meerut „	6·62
Sirhind „	6·72
Lahore „	8·72
Peshawur „	5·17

The importance of these diseases as a cause of mortality must be evident. The principal fatal disease of those of the digestive system has been inflammation of the liver. It has been returned as the cause of 134 deaths in the Bengal Presidency, and of 213 men being invalided.

Spasmodic Cholera prevailed as an epidemic among the European troops in the Benares, Oude, and Meerut divisions.

At Benares, in the beginning of April, several cases of cholera occurred in the 20th Regiment. The troops were immediately encamped, and the disease ceased. In the end of June, however, it again broke out, and continued to prevail in that corps and the battery of Royal Artillery during July and part of August. The troops were, as on the former occasion, moved out of barracks and encamped until it had disappeared from among them. The disease is stated to have been of the most virulent type.

In the Oude division cholera prevailed at Allahabad, Cawnpore, and Lucknow. At the first of these stations it broke out as an epidemic in the 77th Regiment in July, and continued till the end of August. From the 18th of July till the 26th of August, the regiment was encamped as a sanitary measure; but the surgeon has not furnished any information as to its influence upon the progress of the disease. The regiment lost altogether 44 men by cholera. At Cawnpore it prevailed in the 46th Regiment from the middle of July till the end of September. It is stated by the surgeon of the regiment that the type was "the reverse of virulent." Thirty-four cases were returned under the heads of Cholera and Choleraic Diarrhœa, and of these 22 terminated fatally. It is worthy of remark that during the prevalence of the disease in the 46th Regiment a squadron of the 2nd Dragoon Guards and a battery of Royal Artillery had each only one case. At Lucknow cholera broke out about the middle of June among the civil population, and lasted with considerable intensity till the 20th of August. In July it appeared among two companies of the 107th Regiment on duty in the "Fort Muchee Bhawn," and on the 10th of August in the head-quarters of the same regiment in the cantonments. Of 31 cases in the corps, 13 died. During the first twelve days of August the disease prevailed also among the men of the 48th Regiment, nine cases having occurred, of which four died. It then ceased in that corps till the 9th of October, when five cases occurred, all of which died, but the last outbreak was confined to these cases. The 19th Hussars, which was quartered at Lucknow during the first ten months of the year, had only one case of cholera, but it proved fatal, and the Royal Artillery and native troops entirely escaped the disease.

Bengal.

At Agra cholera appeared in the beginning of July, but did not attack the troops till the 21st, when a case occurred in the Royal Artillery. On the 28th the two batteries were moved to Secundra, "a large walled enclosure," and the disease still continuing, they were again moved two miles further on the Muttra road. As this change did not appear to have any influence in checking the epidemic, they were, on the 4th of August, removed across the river, when the disease immediately ceased among them. On the 31st of July cholera broke out in the 23rd Regiment. On the following day two companies were sent across the river and encamped. The disease still continuing in the cantonments, three more companies were sent across on the 6th and 7th of August; and it is worthy of remark that not a single case of the disease occurred among the men encamped on the left bank of the river. The Artillery had altogether 18 cases, of which 11 died, and the 23rd Regiment had 14 cases and 10 deaths.

The history of these outbreaks of cholera furnishes strong evidence of the importance of moving the troops, and encamping them with a view to check the disease when it appears as an epidemic, as directed in the General Orders of 24th April, 1862, by his Excellency the Commander-in-Chief in India; but it may be worthy of consideration whether such a measure would not be advisable for the purpose of *preventing* its occurrence in that form among the troops. It seems to be almost invariably the case that cholera appears in the first instance among the native population, in the neighbourhood of the cantonments, and that it does not attack the troops till after the lapse of a short time. It might deserve a trial whether, by encamping the troops on the first appearance of the disease among the general population, and keeping them encamped until it had subsided, the occurrence among them of these severe and fatal epidemics might not be altogether, or at least to a very great extent, prevented.

TUBERCULAR DISEASES have given rise to a higher ratio of mortality in the Oude, Lahore, and Peshawur divisions than in any of the others but the Presidency, which, for reasons already stated, may be considered exceptional.

ACCIDENTS AND VIOLENCE.—In this class are included 86 cases of sunstroke, of which 16 died. The 89th Regiment, at Mooltan, furnished 36 cases, but only two of them died; they occurred chiefly in June and July, 15 having been admitted in the former and 12 in the latter month.

There were 171 cases of wounds received in action admitted into hospital, and 42 deaths in and out of hospital. These casualties all occurred during the last quarter of the year in a force assembled at the Umbeylah Pass for the purpose of coercing into subjection some hill tribes and fanatics who had been creating disturbances in the Eusufzye country. The 71st Regiment had 15 men killed in action and 3 who died of their wounds; the 101st lost 20 in action, and 4 from their wounds. None of the other troops composing the force lost any men.

The following Table shows the sickness and mortality in each corps while serving in the Bengal Presidency during the year 1863:—

Corps.		Average Strength during the Year.	Admitted into Hospital.	Died.			Ratio per 1,000 of Mean Strength.		Stations during the Year.
				In India.	Invalids on board Ship and at Home.	Total.	Admitted.	Died.	
ROYAL ARTILLERY.									
A Battery,	2nd Brigade, R. H. A. ..	156	266	5	..	5	1,705	32·05	On the march, 1 month; Morar, 11 months.
B „	2nd „ „ ..	150	398	7	..	7	2,653	46·67	On the march, 1 month; Benares, 11 months.
C „	2nd „ „ ..	131	236	5	..	5	1,802	38·17	On march, 3 months; Meerut, 9 months.
D „	2nd „ „ ..	124	290	3	..	3	2,339	24·19	On march, 1 month; Meerut, 11 months.
E „	2nd „ „ ..	153	809	5	..	5	5,288	32·68	Peshawur .. .. Whole year.
F „	2nd „ „ ..	139	208	3	..	3	1,496	21·58	Lucknow .. .. „
A „	5th „ „ ..	134	380	1	..	1	2,836	7·46	Rawul Pindee, 10 months; on march to and encamped near Peshawur, 2 months.
B „	5th „ „ ..	148	241	..	..	..	1,628	..	Meerut, 2⅓ months; on march, ⅔ month; Umballa, 7 months; on march to N.W. frontier, 2 months.
C Head Qrtrs.	5th „ „ ..	146	278	2	..	2	1,917	13·79	Umballa .. .. Whole year.
D „	5th „ „ ..	152	233	1	..	1	1,533	6·58	Meean-Meer, 10 months; on march, 1⅓ month; Peshawur, month.
E „	5th „ „ ..	132	270	4	..	4	2,045	30·30	Meean-Meer .. .. Whole year.
F „	5th „ „ ..	140	313	5	..	5	2,236	35·72	Meean-Meer, 1 month; on march, ⅓ month; Sealkote, 10⅔ months.
A Battery	11th Brigade, R.A. ..	152	237	2	..	2	1,559	13·16	On march, 1 month; Lucknow, 2¼ months; Fyzabad, 8¾ months.
B „	11th „ „ ..	171	224	2	..	2	1,310	11·69	Lucknow .. .. Whole year.
C „	11th „ „ ..	148	194	..	..	..	1,320	..	Seetapore, 8 months; Lucknow, 4 months.
D „	11th „ „ ..	149	147	4	..	4	993	27·03	Bareilly .. .. Whole year.
E „	11th „ „ ..	180	185	1	..	1	1,028	5·55	Lucknow, 1⅜ month; on march, ½ month; Futtygurh, 10⅛ months.
F „	11th „ „ ..	146	168	3	..	3	1,151	20·54	Meerut, 11 months; on march to and at Jullundur, 1 month.
G „	11th „ „ ..	160	391	5	1	6	2,444	37·50	Lucknow, 2 months; Cawnpore, 10 months.
14th Brigade, R.A.	.. .. ..	..	..	..	3	3	..	..	
A Battery	16th Brigade, R.A. ..	115	335	3	..	3	2,913	26·08	Saugor .. .. Whole year.
B „	16th „ „ ..	115	382	3	..	3	3,322	26·08	Jubbulpore .. .. „

Bengal.

Corps.		Average Strength for the Year.	Admitted into Hospital.	Died.			Ratio per 1000 of Mean Strength.		Stations during the Year.
				In India.	Invalids on board Ship and at Home.	Total.	Admitted.	Died.	
C Battery	16th Brigade, R.A. ..	122	223	5	..	5	1,843	41·32	On march, 1 month; Hazareebaugh, 11 months.
D ,,	16th ,, ,, ..	139	268	2	..	2	1,928	14·38	Dinapore .. .. Whole year.
E ,,	16th ,, ,, ..	126	249	3	..	3	1,976	23·81	Allahabad .. .. ,,
F ,,	16th ,, ,, ..	131	247	5	..	5	1,886	38·17	Barrackpore, 11 months; Dum-Dum, 1 month.
G ,,	16th ,, ,, ..	121	263	6	..	6	2,174	49·59	Barrackpore, 11 months; Dum-Dum, 1 month.
A ,,	19th ,, ,, ..	97	656	8	..	8	6,833	83·33	Peshawur, 11 months; on march, 1 month.
B ,,	19th ,, ,, ..	113	470	3	..	3	4,196	26·78	Mooltan .. .. Whole year.
C ,,	19th ,, ,, ..	126	415	4	1	5	3,294	39·68	Peshawur, 9 months: on field service on N.W. frontier, 3 months.
D ,,	19th ,, ,, ..	133	293	5	..	5	2,203	37·59	Ferozepore, 10 months; on field service on N.W. frontier, 2 months.
E ,,	19th ,, ,, ..	118	297	3	..	3	2,538	25·64	On march, 2 months; Jullundur, 8½ months; on march to and at Meean-Meer, 1½ month.
F ,,	19th ,, ,, ..	120	408	7	..	7	3,400	58·33	Rawul Pindee, 9⅓ months; on march, ⅓ month; field service, 2⅓ months.
G ,,	19th ,, ,, ..	129	237	8	..	8	1,837	62·01	On march, 3¾ months; Umritsir, 7 months; Peshawur, 1¼ month.
A ,,	22nd ,, ,, ..	127	318	1	..	1	2,504	7·87	Delhi, 3 months; Meerut, 9 months.
B ,,	22nd ,, ,, ..	114	220	6	..	6	1,930	52·63	Morar, Gwalior .. .. .. Whole year.
C ,,	22nd ,, ,, ..	79	163	..	..	..	2,090	..	Ditto .. .. .. ,,
D ,,	22nd ,, ,, ..	63	162	1	1	2	2,613	32·26	Meerut .. .. ,,
E ,,	22nd ,, ,, ..	118	287	3	..	3	2,432	25·42	Jhansi .. .. ,,
F ,,	22nd ,, ,, ..	130	341	14	..	14	2,667	108·53	Hazareebaugh, 1 month; on march, 2 months; Agra, 9 months.
G ,,	22nd ,, ,, ..	130	598	6	..	6	3,908	46·15	Allahabad, 1½ month; on march, 1½ month; Delhi, 9 months.
1st ,,	24th ,, ,, ..	61	130	6	1	7	2,131	114·76	Fort Govindghur, Umritzur .. Whole year.
2nd ,,	24th ,, ,, ..	74	324	2	2	4	4,438	54·79	Peshawur .. .. .. ,,
3rd ,,	24th ,, ,, ..	75	122	..	1	1	1,627	13·33	Meean-Meer .. .. .. ,,
4th ,,	24th ,, ,, ..	52	164	3	..	3	3,154	57·69	Meean-Meer, 1½ month; on march, 1 month; Attock, 9 months; Fort Michnee, ½ month.

5th Battery 24th Brigade, R.A. ..	98	154	3	..	3	1,770	34·48	Lucknow .. .. Whole year.
6th „ 24th „ „ ..	63	208	7	..	7	3,302	111·11	Meerut, 1½ month; on march, 1½ month; Mooltan, 9 months.
1st „ 25th „ „ ..	44	208	3	..	3	4,727	68·18	Delhi .. .. Whole year.
2nd „ 25th „ „ ..	57	168	1	..	1	2,947	17·54	Saugor .. .. „
3rd „ 25th „ „ ..	53	72	3	1	4	1,385	76·92	Calcutta .. .. .. „
4th „ 25th „ „ ..	73	143	3	..	3	1,986	41·67	Allahabad .. .. .. „
5th „ 25th „ „ ..	71	181	7	..	7	2,549	98·59	Agra .. .. „
6th „ 25th „ „ ..	68	258	5	..	5	3,851	74·63	Benares .. .. .. „
Artillery Band	41	41	..	..	..	1,000	..	Meerut .. .. „
R.A. (Brigade not specified)	..	..	..	2	2	..	..	
Total Royal Artillery	6,097	14,386	197	13	210	2,365	34·53	
CAVALRY.								
2nd Dragoon Guards	411	650	7	1	8	1,582	19·46	Benares, whole year; (one squadron at Cawnpore 11 months.)
7th „ „	575	717	3	..	3	1,247	5·22	Umballa, 11 months; on march to N.W. frontier, 1 month.
7th Hussars	566	1,932	11	1	12	3,413	21·20	On march, 1½ month; Peshawur, 10½ months.
8th „	560	384	6	1	7	686	12·50	Meerut, 10⅔ months; on march to and at Calcutta, 1⅓ month.
19th „	357	651	7	..	7	1,824	19·61	Lucknow, 10 months; on march, 1 month; Meerut, 1 month.
20th „	474	778	11	2	13	1,641	27·43	Sealkote, 10⅔ months; on march, 1⅓ month.
21st „	609	1,102	8	..	8	1,310	13·14	On march, 1½ month; Muttra, 9½ months; Umballa, 1 month.
Total Cavalry	3,552	6,214	53	5	58	1,749	16·33	
INFANTRY.								
7th Foot, 1st Battalion	1,051	1,145	14	3	17	1,089	16·17	Ferozepore, 9⅔ months; on march to and at Umbeyla Pass, 2⅓ months; (detachments at Kussowlie and Meean-Meer.)
13th „ „	846	1,300	27	1	28	1,537	33·09	On march, 1 month; Dum-Dum, 9⅓ months; Calcutta 1⅔ months.
19th „ „	866	1,441	32	1	33	1,664	38·11	Meean-Meer, 2½ months; on march, 1¼ month; Kussowlie, 5¾ months; Ferozepore, 2½ months (detachment at Umritsir whole year).
20th „ „	842	1,618	42	..	42	1,922	49·88	Benares, 10½ months; Roorkee and Futtygurh, 1½ month.

Corps.	Average Strength for the Year.	Admitted into Hospital.	Died.			Ratio per 1000 of Mean Strength.		Stations during the Year.
			In India.	Invalids on board Ship and at Home.	Total.	Admitted.	Died.	
23rd Foot 1st Battalion	983	1,397	19	1	20	1,421	20·34	Agra .. .. Whole year.
27th „	863	1,018	15	1	16	1,180	18·54	Gondah, 10 months; on march, 1⅓ month; Dinapore, ⅔ month.
34th „	821	828	10	1	11	1,009	13·40	Right wing, Seetapore, whole year; Left wing, Roy Bareilly, 10 months; on march, ½ month; Seetapore, 1½ month.
35th „	915	1,893	20	3	23	2,069	25·14	On march, ¼ month; Fyzabad, 11¾ months.
36th „	73	91	..	..	..	1,247	..	Calcutta and Benares, 1 month (arrived at Calcutta, 30th Nov).
38th „	930	1,380	13	1	14	1,484	15·05	Dinapore, 11½ months; on march, ½ month.
42nd „	841	621	16	4	20	738	23·78	Dugshai, 11½ months; on march ½ month.
43rd „	611	1,012	18	7	25	1,656	40·92	Barrackpore, 1 month; Calcutta, 8 months (embarked for New Zealand, 30th Sept.)
46th „	920	972	35	..	35	1,057	38·04	Cawnpore, 10½ months; on march, ½ month; Shahjehanpore, 1 month.
48th „	903	873	32	1	33	967	36·54	Lucknow, 11½ months; on march, ½ month.
51st „	953	1,227	12	1	13	1,288	13·64	Rawul-Pindee, 9⅓ months; on field service to N.W. frontier, 2⅔ months.
52nd „	869	1,320	19	2	21	1,519	24·17	On march, 2 months: Hazareebaugh, 10 months.
54th „	935	1,232	13	4	17	1,318	18·18	Right wing, Roorkee, 10 months; on march, 1 month; Benares, 1 month; Left wing, Moradabad, 10 months; on march, 1 month; Benares, 1 month.
71st „	886	1,982	36	4	40	2,237	45·14	Nowshera, 9½ months; on field service to N.W. frontier, 2½ months.
77th „	854	1,365	78	..	78	1,598	91·33	Allahabad .. .. .. Whole year.
79th „	1,000	3,662	18	2	20	3,662	20·00	Peshawur, whole year; (detachment at Cheeratt, 8 months.)
80th „	960	1,642	17	2	19	1,710	19·79	Jhansi, whole year; (detachments at Gwalior and Sipree.)
81st „	904	1,547	19	5	24	1,711	26·55	Morar .. .. Whole year.

82nd Foot	969	875	33	4	37	903	38·18	Delhi, 2 months; on march, ¼ month; Subathoo, 9¾ months.
88th "	966	1,075	20	2	22	1,113	22·77	Right wing, Shahjehanpore, 11 months; on march, ½ month; Cawnpore, ½ month; Left wing, Futtygurh, 11½ months; Cawnpore, ½ month.
89th "	939	2,093	11	2	13	2,229	13·84	Mooltan.. .. .. .. Whole year.
90th "	776	1,490	18	2	20	1,920	25·77	Meerut, 11 months; on march to Lahore, 1 month.
91st "	805	1,737	22	1	23	1,880	24·89	Jubbulpore, 10½ months (arrived from Madras Presidency, Feb. 16th).
93rd "	897	1,658	15	..	15	1,848	16·72	Sealkote, 10 months; on march to N.W. frontier, 2 months.
94th "	720	879	4	..	4	1,221	5·55	Jullundur, 10⅓ months; on march, ⅙ month; Meean-Meer, 1½ month.
97th "	980	1,772	21	1	22	1,808	22·45	Jubbulpore, 1 month; Saugor and Nowgong, 11 months.
98th "	1,000	1,279	16	..	16	1,279	16·00	On march, 1½ month; Umballa, 10½ months.
101st "	1,027	3,402	44	2	46	3,313	44·79	On march, 1 month; Rawul-Pindee, 7 months; on field service to N.W. frontier, 4 months.
104th "	768	940	10	1	11	1,240	14·42	On march, ½ month; Bareilly, 11½ months.
107th "	766	1,482	32	3	35	1,870	45·69	Fyzabad and on march, ⅔ month; Lucknow, 11⅓ months.
Rifle Brigade, 2nd Battalion	961	1,920	19	1	20	1,998	20·81	Subathoo, 1 month; on march, ⅔ month; Delhi, 10⅓ months.
Ditto, 3rd "	978	1,051	14	3	17	1,0 5	17·88	Bareilly, ½ month; on march, 3 months; Meean-Meer, 7⅓ months; field service on N.W. frontier, 1⅙ month.
Total Infantry	31,373	51,873	784	66	850	1,631	27·09	

Bengal.

This Table shows the proportion of sickness and mortality to have been highest in the Royal Artillery, and the sickness to have been lowest in the Infantry, and the deaths in the Cavalry. The batteries of Artillery at Peshawur, Delhi, Benares, and Mooltan, furnished the highest rates of admissions, the 7th Hussars at Peshawur, the 79th Foot at the same station, and the 101st at Rawul Pindee. The mortality in the Artillery was highest in the batteries at Benares, Agra, Delhi, Peshawur, and Umritsir; among the Cavalry in the 20th Hussars at Sealkote; and the Infantry in the 20th Regiment at Benares, the 77th at Allahabad, the 107th at Lucknow, and the 71st and 101st on field service.

The lowest ratio of sickness in the Cavalry was in the 8th Hussars at Meerut, and in the Infantry in the 42nd Regiment at Dugshai; and the lowest ratio of deaths in the Cavalry was in the 7th Hussars at Umballa, and in the Infantry in the 94th at Jullundur.

II. MADRAS.

Madras.

It has been already stated that the admissions into hospital among the European troops employed in Madras and its military dependencies of Birmah and Singapore in 1863 amounted to 1,255, and the deaths, inclusive of those of invalids, to 22·11 per 1,000 of the strength. Exclusive of these the deaths were in the ratio of 19·41 per 1,000.

The following Table shows the sickness and mortality, exclusive of the invalids, at the different stations, which have been grouped together on the same principles as in former reports:—

Stations.		Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per 1,000 of Strength.	
					Admitted.	Died.
Sea Coast .	Fort St. George and St. Thomas's Mount	1,394	2,296	27	1,647	19·82
	Cannanore	691	711	8	1,029	11·58
	Waltair	133	226	2	1,699	15·04
	Calicut	80	80	2	1,000	25·00
	Masulipatam	46	11	2	239	43·48
Plains ..	Trichinopoly	245	364	4	1,486	16·33
	Malleapooram	134	157	3	1,172	22·39
Table Lands	Bangalore	1,753	1,964	28	1,120	15·97
	Bellary	1,073	1,366	16	1,273	14·91
	Secunderabad	2,404	2,956	34	1,230	14·14
	Kamptee	1,344	2,253	14	1,676	10·42
	Seetabuldee	105	70	2	667	19·05
Hill Station ..	Wellington	548	791	11	1,443	20·07
Birmah .	Rangoon	1,236	701	11	567	8·90
	Tonghoo	489	405	8	828	16·36
	Thayetmyo	611	754	33	1,234	54·01
Singapore ..	Singapore	81	124	1	1,531	12·35
Depôts ..	Poonamallee	156	426	19	2,731	121·89
	Ramandroog	44	106	4	2,409	90·91
Deaths among the troops on the march, or detached from their Corps ..		..	..	17	..	..

From this Table it will be seen that the admissions have not been excessive at any of the stations except the depôts of Poonamallee and Ramandroog. Leaving out of consideration those stations at which the force has been so very small as to preclude the probability of an average result being obtained, the mortality has not amounted to two per cent. at any except Thayetmyo, in Birmah, where a sharp, though fortunately short, outbreak of cholera raised it to nearly 5½ per cent. *Madras.*

The admissions into hospital and deaths by the various classes of diseases at each of these groups of stations are shown in the following Table :—

Madras

	Stations on Sea Coast.		Stations on Plains.		Stations on Table Lands.		Hill Stations.		Birmah.		Singa-pore.		Depôt at Poonamallee, and Sanatorium at Ramandroog.		Stations on Sea Coast.		Stations on Plains.		Stations on Table Lands.		Hill Stations.		Birmah.		Singapore.		Poonamallee and Ramandroog.	
Average Strength ...	2,345		379		6,715		548		2,336		81		199		Annual Ratio per 1,000 of Strength.													
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Miasmatic Diseases ...	1000	17	135	1	3367	25	293	5	645	36	41	...	243	4	426·4	7·25	356·2	2·64	501·4	3·72	534·7	9·12	276·1	15·41	506·1	...	1221·1	20·10
Enthetic " ...	655	2	180	...	1728	1	102	...	458	...	6	...	71	...	279·3	·85	474·9	...	257·3	·15	186·1	...	196·1	...	74·1	...	356·8	...
Dietic " ...	77	1	1	...	103	1	14	...	45	...	...	...	5	...	32·8	·43	2·6	...	15·3	·15	25·6	...	19·3	...	...	...	25·1	...
Parasitic " ...	36	...	17	...	47	...	7	...	5	...	...	...	...	...	15·4	...	44·9	...	7·0	...	12·8	...	2·1	...	...	...	...	...
Diathetic " ...	14	...	1	...	40	1	2	...	6	...	...	...	1	...	6·0	...	2·6	...	6·0	·15	3·6	...	2·6	...	...	...	5·0	...
Tubercular " ...	29	3	6	...	128	10	7	1	23	2	2	...	38	4	12·4	1·28	15·8	...	19·1	1·49	12·8	1·83	9·8	·86	24·7	...	191·0	20·10
Diseases of the—																												
Nervous System...	101	6	12	2	210	8	43	2	59	...	6	...	21	3	43·1	2·56	31·7	5·28	31·3	1·19	78·5	3·64	25·3	...	74·1	...	105·5	15·07
Circulatory " ...	37	...	9	1	80	4	9	...	9	2	...	1	12	...	15·8	...	23·8	2·64	11·9	·60	16·4	...	3·8	·86	...	12·35	60·3	...
Respiratory " ...	194	2	7	...	309	5	28	1	53	...	6	...	10	...	82·7	·85	18·5	...	46·0	·74	51·1	1·83	22·7	...	74·1	...	50·3	...
Digestive " ...	393	5	49	...	877	24	81	...	162	3	15	...	68	10	167·6	2·13	129·3	...	130·6	3·57	147·8	...	69·3	1·29	185·2	...	341·7	50·25
Urinary " ...	14	1	1	...	18	...	2	...	3	...	...	...	1	1	6·0	·43	2·6	...	2·7	...	3·6	...	1·3	...	...	...	5·0	5·03
Reproductive " ...	51	...	3	...	134	...	7	...	42	...	...	...	5	...	21·7	...	7·9	...	20·0	...	12·9	...	18·0	...	...	...	25·1	...
Locomotive " ...	19	...	...	...	31	...	3	...	9	...	1	...	6	...	8·1	...	...	...	4·6	...	5·5	...	3·8	...	12·3	...	30·2	...
Integumentary " ...	333	...	52	1	805	...	64	...	189	...	28	...	33	...	142·0	...	137·2	2·64	119·9	...	116·8	...	80·9	...	345·7	...	165·8	...
Diseases of Nutrition	19	...	3	...	19	...	21	1	14	1	...	...	1	...	8·1	...	7·9	...	2·8	...	38·3	1·83	6·0	·43	...	...	5·0	...
Accidents	322	4	45	1	757	12	102	1	135	8	19	...	17	1	137·3	1·70	118·8	2·64	112·7	1·79	186·1	1·83	57·8	3·42	234·6	...	85·4	5·03
Homicide	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Suicide	...	...	...	1	...	3	...	...	...	...	...	...	...	...	...	...	...	2·64	...	·45	...	...	...	...	...	...	...	...
Corporal Punishment	9	...	...	...	13	...	6	...	2	...	...	...	...	...	3·8	...	...	...	1·9	...	10·9	...	·9	...	...	...	...	...
Diseases not specified	21	...	...	...	9	...	...	...	1	...	...	...	...	...	9·0	...	...	...	1·3	...	...	...	·4	...	...	...	...	...
Total	3324	41	521	7	8675	94	791	11	1860	52	124	1	532	23	1417·5	17·48	1374·7	18·48	1291·8	14·00	1443·4	20·08	796·2	22·27	1530·9	12·35	2673·3	115·58

The admissions into hospital have not been excessive in any of the groups, with the exception of the depôt at Poonamallee and sanatorium at Ramandroog. With the same exception, the mortality has exceeded two per cent. only in Birmah, and there, but for the epidemic of cholera at Thayetmyo, the ratio would only have been 13·28. The mortality at the hill station of Wellington has been comparatively high, but two of the deaths were of men sent up for change of climate from other stations. If the strength and deaths of men sent to the depôt there be deducted, the mortality of the troops employed at the station would be 18·14 per 1,000.

Madras.

MIASMATIC DISEASES have been the most prevalent class in all the groups of stations, except those of the Plains. On subdividing them in the usual manner, the following are the results :—

Madras

Diseases.	Stations on Sea Coast.		Stations on Plains.		Stations on Table Lands.		Hill Stations.		Birmah.		Singa-pore.		Poonamallee and Ramandroog.		Stations on Sea Coast.		Stations on Plains.		Stations on Table Lands.		Hill Stations.		Birmah.		Singapore.		Poonamallee and Ramandroog.	
	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	2	...	...	...	2	...	...	...	1	...	...	..	1	...	·8	...	...	...	·3	...	...	...	·4	...	...	...	5·0	...
Paroxysmal „	282	1	34	...	1419	3	88	...	87	...	20	...	42	...	120·3	·43	89·7	...	211·3	·44	160·6	...	37·2	...	246·9	...	211·0	...
Continued „	110	3	2	...	223	5	26	1	159	6	1	...	8	...	46·9	1·28	5·3	...	33·2	·74	47·4	·18	68·1	2·57	12·3	...	40·2	...
Dysentery and Diarrhœa ...	289	3	25	...	954	11	83	1	244	9	7	...	103	4	123·2	1·28	65·9	...	142·1	1·64	151·5	·18	104·5	3·85	86·4	...	517·6	20·10
Spasmodic Cholera	18	10	1	1	55	6	11	3	34	21	...	...	...	...	7·7	4·26	2·6	2·64	8·2	·89	20·1	·55	14·5	8·99	...	...	...	...
Sorethroat and Influenza ...	27	...	5	...	101	...	12	...	13	...	4	...	...	...	11·5	...	13·2	...	15·0	...	21·9	...	5·6	...	49·4	...	...	...
Ophthalmia	45	...	12	...	181	...	7	...	46	...	1	...	13	...	19·2	...	31·6	...	27·0	...	12·8	...	19·7	...	12·3	...	65·3	...
Rheumatism	168	...	48	...	325	...	62	...	56	...	5	...	74	...	71·6	...	126·6	...	48·4	...	113·1	...	24·0	...	61·7	...	371·9	...

Paroxysmal Fevers have given rise to comparatively a small amount of sickness in Birmah, and have not been very prevalent at Trichinopoly, the only station on the plains. The latter has also been remarkably free from fevers of the continued type. *Madras.*

Dysentery and Diarrhœa have been a source of considerable sickness in all the groups of stations, and of mortality in Birmah.

Spasmodic Cholera broke out as an epidemic in the left wing of the 60th Rifles stationed at Thayetmyo, in Birmah, on the 21st of April, and subsequently in the battery of Royal Artillery at the same place. It continued to prevail there till the 18th of May, when it suddenly ceased. During that period the Rifles lost 17 and the Artillery 4 men by the disease.

Cholera attacked a portion of the 69th Regiment at Coimbatore, when *en route* from Wellington. Two cases proved fatal then and five subsequently to their arrival at Fort St. George. With these exceptions, the disease can scarcely be said to have been epidemic at any of the other stations in the Command.

Next in importance to miasmatic diseases are those of the DIGESTIVE SYSTEM. One-half of the admissions and above four-fifths of the deaths included in it were caused by inflammation of the liver. The stations in Birmah are the only group which appears to enjoy any relative exemption from them, the admissions in it amounting to only half the ratio in any of the other groups.

Sunstroke.—Under this head 21 cases are returned, with 8 deaths. Of the latter, three occurred at Kamptee, two at Secunderabad, one at Poonamallee, one at Bellary, and one at Tonghoo.

The sickness and mortality in each corps are shown in the following Table :—

Madras.

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
Artillery.								
Head-Quarters, and C Battery, 3rd Brigade, R. H. A...	151	233	3	..	3	1,543·1	19·87	Bangalore .. .. Whole Year
A Battery, 3rd Brigade, R. H. A. ..	135	332	3	..	3	2,459·3	22·22	Kamptee, 11½ months; on march, ½ month.
B " 3rd " " ..	152	358	..	..	..	2,355·3	..	Secunderabad .. .. Whole Year
D " 3rd " " ..	144	301	2	..	2	2,090·3	13·89	Bellary.. .. .. "
2nd " 13th Brigade, R. A. ..	..	..	2	..	2	..	..	
A " 14th " " ..	190	127	7	..	7	668·4	36·84	Bangalore, 10 months; arrived in Madras from Bengal, 12th February.
B " 14th " " ..	161	133	2	..	2	826·1	12·42	Secunderabad .. .. Whole Year
C " 14th " " ..	161	215	4	..	4	1,335·4	24·84	Secunderabad, 10½ months; on march, 1½ months.
17th Brigade	240	492	5	..	5	2,050·0	20·83	St. Thomas's Mount .. .. .. Whole Year
3rd and 4th Batteries, 17th Brigade, R. A.	43	61	2	..	2	1,418·7	46·51	Singapore, 3½ months.
5th Battery, 17th Brigade, R. A. ..	103	99	2	..	2	961·2	19·42	Secunderabad .. .. Whole year
A " 20th " " ..	74	93	2	..	2	1,256·8	27·03	Rangoon .. .. "
B " 20th " " ..	133	228	4	..	4	1,714·3	30·07	Waltair .. .. "
C " 20th " " ..	167	259	2	..	2	1,550·9	11·98	Trichinopoly .. .. "
E " 20th " " ..	75	82	1	..	1	1,093·4	13·33	Tonghoo .. .. "
F " 20th " " ..	94	153	2	..	2	1,627·7	21·28	Cannanore .. .. "
Head-Quarters, and D Battery, 20th Brigade, and D Battery, 23rd Brigade, R. A.	292	614	7	..	7	2,102·8	23·97	Kamptee .. .. "
Head-Quarters, and B Battery, 23rd Brigade, R. A.	145	398	1	..	1	2,744·8	6·90	Secunderabad .. .. "
A Battery, 23rd Brigade, R. A. ..	87	159	2	..	2	1,827·6	22·99	Bangalore .. .. "
E " 23rd " " ..	136	221	3	..	3	1,625·0	7·35	Bellary .. .. "
G " 23rd " " ..	140	319	6	..	6	2,278·6	42·86	Thayetmyo .. .. "
C and F Batteries, 23rd Brigade, R. A.	271	541	7	..	7	1,996·3	25·83	St. Thomas's Mount .. .. .. "
Royal Artillery, Brigade not specified	..	..	..	3	3	..	..	
Total Royal Artillery ..	3,094	5,418	69	3	72	1,751·2	23·27	

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
CAVALRY.								
1st Dragoon Guards	603	412	9	3	12	683·2	19·90	Bangalore .. .. Whole Year
17th Lancers	536	816	8	6	14	1,522·4	26·12	Secunderabad .. .. „
Total Cavalry	1,139	1,228	17	9	26	1,078·1	22·83	
INFANTRY.								
1st Foot, 1st Battalion	937	1,316	16	2	18	1,404·5	19·21	On march, 1 month; Kamptee, 11 months; detachment at Seetabuldee.
18th „ 1st „	936	847	14	..	14	904·9	14·96	Secunderabad .. .. „
19th „ 2nd „	35	84	..	..	..	2,400·0	..	Rangoon, ½ month; arrived from England Dec. 17.
21st „ 2nd „	152	316	3	..	3	2,079·0	19·74	On march to Bellary, 2 months; arrived from England October 29.
60th „ 3rd „	922	782	42	3	45	848·1	48·81	Head-Quarters and left wing Thayetmyo, 11 months; Rangoon, 1 month; right wing Tonghoo, whole year.
66th „	959	1,256	15	4	19	1,309·7	19·81	Cannanore, ⅓ month; on march, ⅔ month; Bangalore, 11 months.
68th „	827	582	11	3	14	703·7	16·93	Rangoon, 10⅔ months; embarked for New Zealand in November.
69th „	844	1,375	16	1	17	1,629·2	20·14	Fort St. George, whole year; detachments at Palaveram, Poonamallee, and Wellington.
74th „	738	637	15	5	20	863·1	27·10	Bellary .. .. Whole Year
102nd „	647	795	11	4	15	1,228·8	23·18	Cannanore, whole year; detachments at Malleapooram and Calicut.
105th „	585	824	11	..	11	1,408·6	18·80	Trichinopoly, ⅔ month; on march, ⅓ month; Wellington, 11 months.
108th „	205	170	6	..	6	829·8	29·27	On march, ¼ month; Secunderabad, 11¾ months.
Total Infantry	7,787	8,984	160	22	182	1,153·8	23·37	

Madras.

The sickness has been highest in the Royal Artillery, and the mortality in the Infantry, while both have been lowest in the Cavalry. The highest proportion of admissions into hospital was in the head-quarters and B Battery 23rd Brigade at Secunderabad, and in it also was the lowest ratio of mortality. The highest ratio of deaths occurred in the 60th Regiment in Birmah, and was due to the outburst of cholera at Thayetmyo. Omitting that corps, the death-rate in the Infantry was greatest in the 108th Regiment at Secunderabad, and in the Cavalry in the 17th Lancers at the same station; but it was considerably under the average in the 1st Battalion 18th Regiment, also quartered there.

III. Bombay.

Bombay.

The sickness and mortality among the European troops in Bombay at the different stations were as follows :—

Military Divisions.	Stations.	Average Annual Strength.	Admitted into Hospital.	Died in India.	Ratio per 1,000.	
					Admitted.	Died.
Presidency	Colaba	446	508	11	1,139 ·1	24 ·66
	Khandalla (General Depôt) ..	121	185	3	1,528 ·9	24 ·79
Poona ..	Poona	1,862	2,211	19	1,187 ·5	10 ·20
	Sattara	191	238	2	1,246 ·1	10 ·47
	Ahmednuggur ..	586	989	3	1,687 ·7	5 ·12
	Asseerghur ..	94	108	1	1,148 ·9	10 ·64
	Belgaum	1,150	1,167	12	1,014 ·8	10 ·43
	Kirkee	636	1,045	7	1,643 ·1	11 ·01
	Sholapoor	116	217	3	1,870 ·7	25 ·86
Mhow ..	Mhow	1,583	2,919	14	1,844 ·0	8 ·84
	Indore	121	198	3	1,636 ·4	24 ·79
	Neemuch	444	1,508	8	3,396 ·4	18 ·02
	Nusseerabad ..	860	2,667	12	3,101 ·2	13 ·95
	Ajmere	66	234	..	3,545 ·5	..
Northern..	Deesa..	923	1,454	12	1,575 ·3	13 ·00
	Ahmedabad ..	213	450	1	2,112 ·7	4 ·69
	Mount Aboo ..	24	38	..	1,583 ·4	..
	Baroda	95	350	..	3,684 ·2	..
Scinde ..	Kurrachee.. ..	921	1,139	15	1,236 ·7	16 ·29
	Hydrabad ..	614	805	4	1,311 ·1	6 ·51
	Aden..	537	663	10	1,234 ·7	18 ·62
	Sanatoria	465	1,305*	12	2,806 ·5	25 ·81
	On the March ..	249	370	11	1,486 ·0	44 ·18

Neemuch, Nusseerabad, Ajmere, and Baroda, are the only stations in which the admissions have been greatly in excess of the average. The mortality has not been above 2½ per cent. at any af the stations, a result due to the fortunate circumstance that cholera did not prevail as an epidemic among the troops in this Presidency.

The admissions and deaths by the different classes of diseases in each of the military divisions are shown in the following Table :—

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* The greater number of these cases appear to have been transfers, and to have been already included in the returns from the different stations. We have entered them here with a view to show to what extent these sanatoria have been used. The total of the column "admitted into hospital" will, in consequence of this, be found in excess of the number stated in the General Table on page 121.

Bombay.

	Military Divisions	Presidency.		Poona.		Mhow.		Northern.		Scinde.		Aden.		Troops on March		Presidency.		Poona.		Mhow.		Northern.		Scinde.		Aden.		Troops on March.	
	Average Annual Strength	567.		4,635.		3,074.		1,255.		1,535.		537.		249.		Annual Ratio per 1,000 of Strength.													
Order	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.																												
1	Miasmatic Diseases	239	5	2396	15	4865	17	1379	5	867	5	252	1	237	4	421·6	8·82	516·9	3·24	1582·6	5·52	1098·8	3·99	565·0	3·26	469·2	1·86	951·8	16·07
2	Enthetic „	107	...	1373	1	972	...	339	...	306	...	126	...	66	...	188·7	...	296·2	·22	316·2	...	270·1	...	199·3	...	234·6	...	265·1	..
3	Dietic „	42	...	88	1	113	1	21	...	37	1	19	...	1	...	74·1	...	19·0	·22	36·8	·32	16·7	...	24·1	·65	35·4	...	4·0	..
4	Parasitic „	13	...	53	...	24	...	13	...	22	...	...	...	...	...	22·9	...	11·4	...	7·8	...	10·4	...	14·3	...	...	...	...	..
	Class II.																												
1	Diathetic Diseases	5	...	37	2	30	...	12	...	13	...	28	...	1	1	8·8	...	8·0	·43	9·8	...	9·6	...	8·5	...	52·1	...	4·0	4·02
2	Tubercular „	8	...	29	4	23	2	12	1	18	3	5	2	...	...	14·1	...	6·3	·86	7·5	·65	9·6	·80	11·7	1·96	9·3	3·72	...	..
	Class III. Diseases of the—																												
1	Nervous System	33	4	169	4	78	1	52	...	68	...	13	2	3	1	58·2	7·06	36·5	·86	25·4	·32	41·4	...	44·3	...	24·2	3·72	12·1	4·02
2	Circulatory „	6	1	62	1	49	2	15	...	37	2	9	1	2	...	10·6	1·76	13·4	·22	15·9	·65	12·0	...	24·1	1·30	16·8	1·86	8·0	..
3	Respiratory „	26	...	210	2	192	7	30	...	49	...	28	1	6	...	45·9	...	43·3	·43	62·4	2·28	23·9	...	31·9	...	52·1	1·86	24·1	..
4	Digestive „	68	3	513	14	451	3	151	5	125	3	66	3	13	2	119·9	5·29	112·5	3·02	146·7	·97	120·3	3·98	81·4	1·96	122·9	5·60	52·2	8·03
5	Urinary „	...	...	4	...	11	...	8	...	...	...	3	...	...	...	...	...	·9	...	3·6	...	6·4	...	...	...	5·6	...	...	..
6	Reproductive „	4	...	56	...	50	...	30	...	23	...	6	...	3	...	7·1	...	12·1	...	16·3	...	23·9	...	14·9	...	11·2	...	12·1	..
7	Locomotive „	6	...	30	...	30	...	1	...	9	...	2	...	...	...	10·6	...	6·5	...	9·8	...	·8	...	5·9	...	3·7	...	...	..
8	Integumentary „	76	...	431	...	310	...	121	...	205	...	66	...	15	...	134·0	...	93·0	...	100·8	...	96·4	...	133·6	...	122·9	...	60·2	..
	Class IV.																												
4	Diseases of Nutrition	2	...	5	...	26	...	5	...	10	1	1	...	...	...	3·5	...	1·1	...	8·5	...	4·0	...	6·5	·65	1·9	...	...	..
	Class V.																												
1	Accidents	52	1	507	3	295	2	100	...	152	3	36	...	23	3	91·7	1·76	109·4	·65	96·0	·65	79·5	...	99·0	1·96	67·0	...	92·4	12·05
3	Homicide	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	·80	...	...	...	...	...	..
4	Suicide	...	...	...	...	1	2	...	1	1	1	...	...	...	...	...	...	...	...	·3	·65	...	·80	·7	·65	...	...	..	..
6	Corporal Punishment	3	...	6	...	2	...	1	...	...	...	3	...	...	...	5·3	...	1·3	...	·6	...	·8	...	...	...	5·6	...	..	..
	Diseases not specified	3	...	6	...	4	...	2	...	2	...	...	...	...	...	5·3	...	1·3	...	1·3	...	1·6	...	1·3	...	...	...	..	..
	Total... ...	693	14	5975	47	7526	37	2292	13	1944	19	663	10	370	11	1222·3	24·69	1289·1	10·15	2448·3	12·01	1826·2	10·37	1266·5	12·39	1234·5	18·62	1486·0	44·19

Bombay. The admissions have been very high in the Mhow division, and have also been above the average in the northern. With the exception of troops on the march, the mortality has been highest in the Presidency division.

Miasmatic Diseases have been the chief cause of the excess of the admissions into hospital. When subdivided into groups they furnish the following results :—

Military Divisions	Presidency.		Poona.		Mhow.		Northern.		Scinde.		Aden.		Troops on the March.		Presidency.		Poona.		Mhow.		Northern.		Scinde.		Aden.		Troops on the March.	
Average Annual Strength	567		4,635		3,074		1,255		1,535		537		249		Annual Ratio per 1,000 of Mean Strength.													
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Eruptive Fevers	...	...	4	1	3	...	2	1	2	...	...	...	...	...	...	...	·9	·22	1·0	...	1·6	·80	1·3	...	...	...	...	...
Paroxysmal "	106	1	1173	2	3893	6	930	1	457	...	35	1	166	1	186·9	1·76	253·1	·43	1266·5	1·95	741·0	·80	297·7	...	65·2	1·86	666·7	4·02
Continued "	1	...	216	...	143	...	54	...	73	2	47	...	9	...	1·8	...	46·6	·65	46·5	...	43·0	...	47·6	1·30	87·5	...	36·1	...
Dysentery and Diarrhœa	67	2	388	5	267	10	155	2	153	3	50	...	45	2	118·2	3·53	83·7	1·08	86·8	3·25	123·5	1·59	99·7	1·96	93·1	...	180·7	8·03
Spasmodic Cholera	1	2	6	4	...	...	2	1	1	...	...	...	...	1	1·8	3·53	1·3	·86	...	...	1·6	·80	·7	...	..	...	...	4·02
Sorethroat and Influenza	9	...	79	...	117	...	16	...	7	...	2	...	4	...	15·9	...	17·0	...	38·1	...	12·8	...	4·6	...	3·7	...	16·1	...
Ophthalmia	17	...	228	...	88	...	114	...	73	...	94	...	1	...	30·0	...	49·2	...	28·6	...	90·8	...	47·6	...	175·0	...	4·0	...
Rheumatism	36	...	269	...	335	...	59	...	95	...	22	...	10	...	63·5	...	58·0	...	109·0	...	47·0	...	61·9	...	41·0	...	40·2	...

Bombay. It will be seen from this Table that paroxysmal fevers are the most prevalent of the diseases comprised in this class, and that to them is due the very high ratio of admissions in the Mhow and Northern divisions. Nusseerabad, Ajmere, and Neemuch, in the former, and Baroda in the latter, are the stations at which the admissions from this cause have been highest. At Nusseerabad they amounted to 1,852 in a strength of 860.

Dysentery and Diarrhœa were the diseases which caused the greatest mortality, the Presidency and Mhow being the divisions in which the ratio of deaths by them was highest.

Cholera was scarcely seen among the troops during the year. It caused only eight deaths.

Ophthalmia prevailed to a great extent at Aden and in the Northern division. At the former it was confined to the left wing of the 95th Regiment, the Royal Artillery having only two admissions from it. In the northern division it prevailed chiefly in the Royal Artillery at Ahmedabad, and in the Royal Artillery and 56th Regiment at Deesa.

ENTHETIC DISEASES.—The admissions by venereal range between 189 in the Presidency, and 316 per 1,000 of the strength in the Mhow division, the average being 262 per 1,000.

DISEASES OF THE DIGESTIVE SYSTEM are next to the miasmatic class in importance, the mortality from them amounting to nearly 4 per 1,000. They have been most prevalent in the Mhow division, and most fatal in the Presidency, inflammation of the liver being the prominent disease.

The admissions and deaths in the different corps serving in the Bombay Presidency and its dependencies were as follows :—

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
ARTILLERY.								
A Battery, 4th Brigade, R. H. A. ..	146	507	1	..	1	3472·6	6·85	Deesa, 1 month; on march, ⅔ month; Nusseerabad, 10⅓ months.
Head Quarters, and B Battery, 4th Brigade, R.H.A.	149	271	2	..	2	1818·8	13·42	Kirkee .. .. Whole Year
C Battery, 4th Brigade, R.H.A. ..	145	198	1	..	1	1365·5	6·89	Nusseerabad, 1¼ month; on march, 1 month; Mhow, 9¾ months.
D „ 4th „ „ ..	137	252	..	..	..	1839·4	..	Ahmednuggur, 10½ months; Kirkee, 1½ months.
4th Brigade, R. H. A. (Battery not stated)	..	..	..	1	1	..	..	
Head Quarters, and E Battery, 14th Brigade, R.A.	185	358	..	..	..	1935·2	..	Arrived from Bengal February 11; Ahmedabad, 10⅔ months.
D Battery, 14th Brigade, R.A. ..	188	214	3	..	3	1138·3	15·96	Arrived from Bengal Feb. 11; Kirkee, 10⅔ months.
F „ 14th „ „ ..	185	328	4	..	4	1773·0	21·62	Arrived from Bengal February 11; on march, 1 month; Deesa, 9⅔ months.
A „ 18th „ „ ..	142	251	1	..	1	1767·6	7·04	Hydrabad .. .. Whole Year
B „ 18th „ „ ..	154	261	3	1	4	1694·8	25·97	Sholapoor, 10 months; on march, ⅔ month; Kirkee, 1⅓ months.
Head Quarters, and C Battery, 18th Brigade, R. A.	157	366	3	..	3	2331·2	19·11	Kurrachee .. .. Whole Year
D Battery, 18th Brigade, R.A. ..	117	422	2	..	2	3606·8	17·09	Neemuch .. .. „
E „ 18th „ „ ..	147	221	4	..	4	1503·4	27·21	Belgaum .. .. „
F „ 18th „ „ ..	147	346	3	..	3	2353·7	20·41	Kirkee .. .. „
G „ 18th „ „ ..	151	434	1	..	1	2874·2	6·62	Ahmedabad, 3 months; Baroda, 8⅓ months; Dhooliacote, ⅔ month.
18th Brigade, R.A. (Batteries not stated)	..	..	..	3	3	..	..	
Head Quarters, and B Battery, 21st Brigade, R.A.	222	374	4	..	4	1684·7	18·02	Mhow .. .. Whole Year
3rd Battery, 21st Brigade, R.A. ..	66	82	..	..	..	1242·5	..	Belgaum .. .. „
4th „ 21st „ „ ..	75	109	2	..	2	1420·3	26·67	Kirkee, 1⅓ months; Poona, 9⅔ months; Kirkee, 1 month.

Bombay.

Regiments.	Average Annual Strength.	Admitted into Hospital.	Deaths.			Annual Ratio per 1,000.		Stations during the Year.
			In India.	Of Invalids.	Total.	Admitted.	Died.	
6th Battery, 21st Brigade, R.A. ..	79	117	..	..	..	1481·0	..	Kirkee .. .. Whole Year
5th & 7th Batteries, 21st Brigade, R.A.	106	123	3	..	3	1160·4	28·30	5th Battery, Aden, whole year; 7th Battery, Poona, 8 months; Aden, 4 months.
21st Brig., R.A. (Batteries not stated)	..	..	..	2	2	..	..	
R. A. (Brigade not stated)	..	..	..	3	3	..	..	
Royal Engineers	40	53	1	..	1	1325·0	25·00	Poona .. .. Whole Year
Total Ordnance Corps.. ..	2,738	5,287	38	10	48	1931·0	17·49	
CAVALRY.								
3rd Dragoon Guards..	521	763	4	3	7	1464·5	13·44	Ahmednuggur.. .. .. .. Whole Year
6th Dragoons..	581	1,062	7	..	7	1827·9	12·05	Mhow .. .. „
Total Cavalry..	1,102	1,825	11	3	14	1656·1	12·70	
INFANTRY.								
4th Foot, 1st Battalion	935	1,201	5	2	7	1284·5	7·49	Poona .. .. Whole Year
28th Foot	936	2,650	15	1	16	2831·2	17·09	Nusseerabad, whole year; right wing, on march, 2 months; detachment at Ajmere.
33rd „	953	1,061	15	2	17	1113·3	17·84	Bombay, 1⅔ months; Poona, 10⅓ months; detachments at Sattara and Asseerghur.
44th „	953	876	11	1	12	919·2	12·59	Belgaum .. . . Whole Year
56th „	820	1,234	10	5	15	1504·9	18·29	Deesa .. .. „
72nd „	902	1,602	12	..	12	1776·1	13·30	Mhow; detachment at Indore .. „
95th „	979	1,110	14	3	17	1125·7	17·36	Hydrabad, whole year; right wing, Aden, 11 months.
103rd „	719	812	15	1	16	1129·4	22·25	Poona, 1⅓ months; Colaba, 9 months; *en route* to Neemuch, 1⅓ months.
106th „	396	1,129	6	6	12	2851·0	30·30	Neemuch .. .. Whole Year
109th „	722	811	11	2	13	1123·3	18·01	Kurrachee .. .. „
Total Infantry	8,315	12,486	114	23	137	1500·7	16·48	

As in Bengal and Madras, the ratio both of sickness and mortality has been higher in the Artillery than in the Cavalry or Infantry. The admissions have been numerous in the 6th Dragoons at Mhow, but the ratio of deaths in the two Cavalry regiments has been almost identical. *Bombay.*

In the Infantry the admissions have been greatly in excess of the average in the 28th and 106th Regiments, a result due to the former having been stationed at Nusseerabad and the latter at Neemuch. The 103rd at Colaba, and the 106th at Neemuch, are the only Infantry regiments in which the mortality exceeded two per cent. A fair comparison cannot be made of the sickness and mortality in each battery of Artillery, as the numbers under observation are so limited that considerable fluctuations are unavoidably the result.

Section II.

On the extent of Invaliding.

During the year 1863 there were 1,415 invalids sent home to England from Bengal, 506 from Madras, and 401 from Bombay, being in the ratio of 33, 40, and 32 per 1,000 of the strength serving in each Presidency respectively. *India.*

The diseases for which the men were invalided are stated in Abstract No. XXIX. of Appendix, from which the following classified summary has been prepared:—

India.

Order.		Bengal.	Madras.	Bombay.
	Mean Strength	42,575	12,621	12,329
	Class I.			
1	Miasmatic Diseases—			
	Ophthalmia	71	17	22
	Sorethroat	1	..	1
	Erysipelas	1	..	..
	Dysentery and Diarrhœa	69	52	19
	Paroxysmal Fevers ..	77	6	4
	Continued " ..	4	2	..
	Rheumatism	234	54	56
2	Enthetic Diseases	95	58	30
3	Dietic "	1	1	..
4	Parasitic "	..	1	..
	Class II.			
1	Diathetic Diseases ..	23	7	25
2	Tubercular "	90	60	22
	Class III.			
	Diseases of the—			
1	Nervous System ..	118	53	48
2	Circulatory " ..	79	37	46
3	Respiratory " ..	52	13	20
4	Digestive " ..	257	41	64
5	Urinary " ..	5	3	3
6	Reproductive " ..	16	4	3
7	Locomotive " ..	17	9	8
8	Integumentary " ..	26	7	2
	Class IV.			
4	Diseases of Nutrition ..	151	48	19
	Class V.			
1	Accidents	28	16	9
	Worn out	..	17	..
	Total ...	1,415	506	401
	Ratio per 1,000 of mean Strength.. 1863	33·23	40·09	32·52
	Ratio per 1,000 of mean Strength.. 1861-2	27·37*	31·63	29·91

This Table shows a large relative proportion of men invalided from Bengal on account of paroxysmal fevers, rheumatism, and diseases of the digestive system; from Madras for dysentery and diarrhœa, venereal, and tubercular diseases; and from Bombay for diathetic diseases and those of the circulatory system.

The numbers finally discharged the service at the Invalid Depôt in England were, of invalids from Bengal, 773, from Madras, 186, and from Bombay, 407. The disabilities on account of which they were discharged are stated in Abstract No. XXIX. of Appendix, from which the following classified summary has been framed:—

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* Ratio for 1862 only.

	Discharged at the Invalid Depôt, Invalids from—		
	Bengal.	Madras.	Bombay.
Miasmatic Diseases:—			
Paroxysmal Fevers	33	2	19
Continued "	1	..	1
Dysentery and Diarrhœa ..	32	14	27
Ophthalmia	36	8	19
Rheumatism	106	11	57
Enthetic Diseases	73	25	30
Diathetic "	23	9	4
Tubercular "	78	24	36
Diseases of the—			
Nervous System	57	19	32
Circulatory "	74	23	51
Respiratory "	23	5	16
Digestive "	135	15	56
Urinary "	7	1	4
Reproductive "	5	1	2
Locomotive "	15	6	7
Integumentary "	4	3	3
Diseases of Nutrition	53	13	29
Accidents and Violence	12	7	14
Disability not specified	6	..	..
Total	773	186	407
Ratio per 1,000 of Strength ..	18·16	14·74	33·01
" " " 1860–62	10·74	12·62	31·96

This shows a slight increase in the number finally discharged as invalids compared with the average of the three preceding years. Taking the European force in India collectively, the proportion discharged in 1863 was 20·23, and on the average of the three preceding years, 14·57 per 1,000 of the strength. Diseases of the digestive system—chiefly affections of the liver—and rheumatism were the most frequent causes of discharge, but diseases of the nervous and circulatory systems, enthetic and tubercular diseases, dysentery and diarrhœa, and diseases of nutrition, also furnished considerable numbers.

Section III.

Mean Daily Sick.

The average number constantly sick during the year was, in Bengal, 2,635, in Madras, 803, and in Bombay, 791. The following Table gives the usual information based upon these numbers, and brought into comparison with previous results :—

	Bengal.		Madras.		Bombay.	
	1863.	1860-62.	1863.	1860-62.	1863.	1860-62.
Ratio per 1,000 constantly Sick ..	61·89	77·27	63·62	60·80	64·16	69·31
	Days.	Days.	Days.	Days.	Days.	Days.
Average Sick Time to each Soldier	22·59	28·26	23·22	22·19	23·42	25·30
Average Duration of Cases ..	12·84	14·11	18·51	16·53	14·72	13·71

India. This Table shows the average proportion constantly sick and the average sick-time to each soldier to have been nearly alike in the three Presidencies, but the duration of the cases has been considerably longer in Madras than the other two Presidencies, and has been shortest in Bengal. In all these particulars there has been a very marked reduction in Bengal compared with the results of 1860–61. There has also been a reduction in Bombay, except in the duration of the cases, which has increased on the average by one day; but there has been a slight increase in them all in Madras.

Section IV.

On the Influence of Age on the Mortality.

The numbers living at each age in quinquennial periods, at the beginning of the year, and the deaths during the year, including those of the invalids, are shown in the following Table, prepared from Abstract No. XXX. of Appendix :—

India.

	Under 20 years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.
Bengal	1,339	13	16,491	305	15,212	468	5,642	190	2,301	100	466	25
Madras	599	2	3,958	59	4,871	118	1,853	52	878	27	188	14
Bombay	387	1	4,128	33	4,863	68	2,228	54	1,063	29	253	11
Total	2,325	16	24,577	397	24,946	654	9,723	296	4,242	156	907	50
Ratio of Deaths per 1,000 of Strength ..	6·88		16·15		26·22		30·44		36·77		55·13	
Ratio of Deaths per 1,000 of Strength in— Bengal, 1862 .. Madras and Bombay, 1861-2 ..	4·28		18·67		23·67		33·84		39·82		46·43	

The results correspond closely with the average of preceding period, and illustrate the influence of tropical climates upon the constitution, the mortality increasing with age in a much more rapid ratio than in temperate regions.

XIII. ON THE HEALTH OF TROOPS ON BOARD SHIP.

Troops on Board Ship. The number of troops on board ship during the year regarding whom returns have been received was as follows:—

I.	Troops or drafts proceeding on foreign service	11,627
II.	Do. returning from foreign service	3,009
III.	Do. passing by sea from one colony to another, or from one station in a military Command to another	12,506
IV.	Invalids and "time-expired men" returning to England	4,405

In the report for 1861 we explained the principles on which the *average* strength was obtained, and the calculations made of the ratio of sickness and mortality.

I. Troops proceeding on Foreign Service.

The number of men stated in the returns to have embarked for foreign service during the year was 11,627. The cases of sickness and the deaths among them are shown in a classified form in the following Table, compiled from Abstract No. XXXI. of Appendix:—

Troops on Board Ship.

Stations		To Cape of Good Hope, Ceylon, India, and China.				To Mediterranean.				To Australia and New Zealand.			
Number of men Embarked		9,895				103				1,629.			
Average *Annual* Strength..		2,950				8				453.			
Order.	Diseases.	Admitted.	Died.	Ratio per 1,000.		Admitted.	Died.	Ratio per 1,000.		Admitted.	Died.	Ratio per 1,000.	
				Admitted.	Died.			Admitted.	Died.			Admitted.	Died.
	Class I.												
1	Miasmatic Diseases	510	5	172·9	1·69	1	..	142·8	..	93	..	205·3	..
2	Enthetic "	519	..	175·9	..	5	..	714·3	..	80	..	176·6	..
3	Dietic "	17	..	5·8	..	..	..	..	..	1	..	2·2	..
4	Parasitic "	47	..	15·9	..	..	..	..	..	2	..	4·4	..
	Class II.												
1	Diathetic Diseases ..	5	..	1·7	..	..	..	..	..	1	..	2·2	..
2	Tubercular " ..	33	2	11·2	·68	..	..	..	..	4	..	8·8	..
	Class III. Diseases of the—												
1	Nervous System ..	51	..	17·3	..	..	..	..	..	2	1	4·4	2·21
2	Circulatory " ..	5	..	1·7	..	..	..	..	..	..	..	..	..
3	Respiratory " ..	106	1	35·9	·34	..	..	..	..	30	..	66·2	..
4	Digestive " ..	90	..	30·5	..	..	..	..	..	23	..	50·8	..
5	Urinary " ..	2	..	·7	..	..	..	..	..	1	1	2·2	2·21
6	Reproductive " ..	19	..	6·4	..	..	..	..	..	4	..	8·8	..
7	Locomotive " ..	7	..	2·4	..	..	..	..	..	..	..	..	..
8	Integumentary " ..	360	1	122·0	·34	..	..	..	..	61	..	134·7	..
	Class IV.												
4	Diseases of Nutrition ..	3	..	1·0	..	..	..	..	..	..	..	..	..
	Class V.												
1	Accidents	221	3	74·9	1·02	..	..	..	..	33	1	72·9	2·21
6	Corporal Punishment..	5	..	1·7	..	..	..	..	..	..	..	..	..
	Total	2000	12	677·9	4·07	6	..	750·	..	335	3	739·5	6·63

In none of these groups was there any amount of sickness and mortality to call for special remarks. The admissions by venereal probably arose from those excesses which men are so apt to commit at the port of embarkation. Of the five deaths from miasmatic diseases one was caused by scarlet fever, three by continued fever, and one by bilious cholera. They occurred in different ships. One of the cases of fever is stated to have been apparently the result of long-continued sea-sickness. All the deaths in the class of accidents were by drowning.

II. Troops Returning from Foreign Service.

The classes of diseases by which the sickness and mortality among the troops returning to England from foreign service were caused are shown in the following Table framed from No. XXXII. of Appendix :—

Summary.

Stations		From India, China, and the Cape of Good Hope.				From the West Indies.				From British America.			
Number of Men Embarked		2,384				212				413			
Average *Annual* Strength.		673				23				23			
				Ratio per 1,000.				Ratio per 1,000.				Ratio per 1,000.	
Order.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.												
1	Miasmatic Diseases ..	477	17	708·8	25·26	6	..	260·9	..	5	..	217·4	..
2	Enthetic " ..	63	..	93·6	..	5	..	217·4	..	3	..	130·4	..
3	Dietic.. " ..	6	..	8·9	..	..	..	..	..	..	..	..	..
4	Parasitic " ..	7	..	10·4	..	..	..	..	..	..	..	..	..
	Class II.												
1	Diathetic Diseases ..	1	..	1·5	..	..	..	..	..	..	..	..	..
2	Tubercular " ..	3	1	4·5	1·49	..	..	..	..	..	..	..	..
	Class III. Diseases of the—												
1	Nervous System ..	8	..	11·9	..	..	..	..	..	..	..	..	..
2	Circulatory " ..	..	1	..	1·49	..	..	..	..	..	..	..	..
3	Respiratory " ..	41	..	60·9	..	6	..	260·9	..	2	..	87·0	..
6	Digestive " ..	36	3	53·5	4·46	3	..	130·4	..	..	..	..	..
5	Urinary " ..	4	..	5·9	..	..	..	..	..	..	..	..	..
6	Reproductive " ..	6	..	8·9	..	..	..	..	..	..	..	..	..
8	Integumentary " ..	53	1	78·8	1·49	8	..	347·8	..	..	..	..	..
	Class IV.												
4	Diseases of Nutrition ..	3	..	4·5	..	..	..	..	..	..	..	..	..
	Class V.												
1	Accidents	26	1	38·6	1·49	3	..	130·4	..	1	..	43·5	..
	Total	734	24	1090·7	35·68	31	..	1347·8	..	11	..	478·3	..

The sickness and mortality among the troops returning from India and China have been high. The excess of the former was chiefly in the 31st Regiment, from Shanghai, 512 cases having occurred in it during the voyage home. Ague and diarrhœa were the diseases which chiefly prevailed, and were evidently the result of service in China; but in addition to these, ophthalmia broke out off the Cape of Good Hope among the men in the "West Derby," and caused 104 admissions in a strength of 314 men.

The mortality was very high in the 31st Regiment, 13 deaths having occurred in a strength of 646 embarked; and the Royal Artillery, likewise returning from Shanghai, lost 8 out of 159 men. Three of the deaths in the 31st Regiment were from cholera, immediately after embarking at Shanghai; the others, both in the Artillery and 31st, were mostly the result of tropical disease. The accidental death was that of a man of the 31st Regiment, who fell overboard.

III. TROOPS PROCEEDING FROM ONE COLONY OR ONE STATION TO ANOTHER

Troops on Board Ship.

The principal movement of troops during the year comprised in this cl was that of the 43rd Regiment from Calcutta, the 68th from Birmah, and t 50th from Ceylon to New Zealand. The following Table, compiled fro Abstract No. XXXIII. of Appendix, shows the sickness and mortality in th corps and in the other troops changing stations.

Stations		From India and Ceylon to New Zealand.				Other Intermediate Changes.				West Indies an Western Africa- Black Troops.			
No. of Men embarked ..		2,347				7,811				2,348			
Average *Annual* Strength		347				149				168			
				Ratio per 1,000.				Ratio per 1,000.				Ratio pe 1,000.	
Order.	Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
	Class I.												
1	Miasmatic Diseases..	205	4	590·8	11·52	41	..	275·2	..	28	1	166·6	5 5
2	Enthetic " ..	62	..	178·6	..	13	..	87·3	..	55	..	327·4	.
3	Dietic " ..	1	..	2·9	..	1	..	6·7	..	..	..	..	.
4	Parasitic " ..	..	..	..	..	..	..	..	..	..	..	..	.
	Class II.												
1	Diathetic Diseases ..	2	..	5·7	..	1	..	6·7	..	..	..	..	.
2	Tubercular " ..	1	..	2·9	..	..	..	..	..	1	1	6·0	5 5
	Class III. Diseases of the—												
1	Nervous System..	8	..	23·0	..	1	..	6·7	..	..	..	..	.
2	Circulatory " ..	..	..	..	..	1	..	6·7	..	..	..	..	.
3	Respiratory " ..	43	1	123·9	2·88	4	..	26·8	..	23	2	136·9	1190
4	Digestive " ..	23	..	66·1	..	3	..	20·1	..	3	..	17·8	.
5	Urinary " ..	1	..	2·9	..	..	..	..	..	..	..	..	.
6	Reproductive " ..	7	..	20·1	..	1	..	6·7	..	..	..	..	.
7	Locomotive " ..	1	..	2·9	..	..	..	..	..	1	..	6·0	.
8	Integumentary " ..	70	..	201·7	..	47	..	315·5	..	10	..	59·5	.
	Class IV.												
4	Diseases of Nutrition	..	..	..	..	..	..	..	..	..	..	..	.
	Class V.												
1	Accidents..	39	1	112·4	2·88	12	..	80·5	..	6	..	35·7	..
6	Corporal punishment	..	..	..	..	..	..	..	..	1	..	6·0	..
	Total	463	6	1333·9	17·28	125	..	838·9	..	128	4	761·9	23·80

The 43rd Regiment furnished the largest proportion of cases, chiefly the result of previous tropical service. Three of the deaths occurred in that corps, two in the 68th, and one in the 50th. One of the deaths in the 43rd was caused by sunstroke.

IV. Invalids, &c., returning to England.

Troops on Board Ship.

In some of the returns it has been impossible to separate "time-expired" en from invalids with whom they embarked to return home. As the deaths nong the latter have been already included in the mortality of the different ations at which they were serving when invalided, it is unnecessary to enter to details regarding them. It may be sufficient to state that of the 4,405 en included in this class, 1,769 embarked sick, 304 cases of sickness occurred uring the voyage, and 140 died. Of 2,450 invalids embarked from China and dia, 134, or nearly 5¼ per cent., died before reaching their native shores.

XIV. ON THE INFLUENCE OF LENGTH OF SERVICE ON MORTALITY IN THE ARMY.

In the report on the mortality of the French army for 1862, a Table was given showing the ratio of mortality among the troops at different periods of service. This brought out the unexpected result of a decrease in the proportion of deaths with increase in the length of service during the first ten years. The report for 1863 shows a similar result, except that the ratio has been rather higher in the class under one year's service. The following Table shows the results for the two years :—

French Army, exclusive of Officers.	Proportion of deaths per 1,000 serving at each period.	
	1862.	1863.
Under 1 Year's Service	11·61	13·65
From 1 to 3 Years' Service ..	13·70	13·09
" 3 to 5 " " ..	9·72	10·12
" 5 to 7 " " ..	8·26	7·16
" 7 to 10 " " ..	5·97	6·22
" 10 to 14 " " ..	6·84	6·73
Above 14 Years' Service	8·36	8·47

As these results appeared to involve a principle of great importance, and to be at variance with the law of a progressive increase in the rate of mortality with the advance of age, we have deemed it necessary to institute a similar inquiry into the influence of length of service on the death-rate in the British army. With this view we have prepared a Table from the returns furnished by the Commanding Officers, showing the number of men serving and the number of deaths in each quinquennial period of service throughout the army, with the exception of the regiments serving in Bengal, from which the returns were not available. But to eliminate as much as possible the influence of climate upon the law of mortality, and at the same time to have sufficient numbers under observation to avoid accidental irregularities, we have grouped together the regiments serving at different stations in the following Table :—

Length of Service.	United Kingdom.		Mediterranean and British America.		West Indies, St. Helena, Cape, and Mauritius.		Australasia.		Ceylon, China, Madras, and Bombay.		Total.	
	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.	Strength on 1st January.	Died during Year.
Under 5 years	38,014	175	15,215	64	4,409	26	2,945	53	10,263	138	70,846	456
5 to 10 „	20,203	176	9,988	96	2,669	41	2,047	37	11,510	275	46,417	625
10 to 15 „	7,362	92	1,700	13	405	5	661	16	2,714	57	12,842	183
15 to 20 „	6,227	123	1,156	30	312	6	604	18	2,057	84	10,356	261
20 and upwards	2,498	37	461	13	19	1	195	6	495	15	3,668	72
Total	74,304	603	28,520	216	7,814	79	6,452	130	27,039	569	144,129	1,597
	Ratio of Deaths per 1,000 of Strength.											
Under 5 years..	4·60		4·21		5·90		18·00		13·45		6·44	
5 to 10 „	8·71		9·61		15·36		18·08		23·89		13·46	
10 to 15 „	12·50		7·63		12·35		24·21		21·00		14·25	
15 to 20 „	19·75		25·95		19·23		29 80		40·84		25·20	
20 and upwards	14·81		28·20		52·63		30·77		30·30		19·63	
Total	8·13		7·57		10·11		20·15		21·04		11·08	

It seems scarcely necessary to observe that the strength, as stated in this Table, cannot agree with that in the previous portions of the Report, as it represents the numbers on the 1st January, while the other is the *average* strength throughout the year. The ratio of deaths, also, is much below that given in the general summary, as the regiments serving in Bengal are unavoidably omitted from this Table.

This Table shows an increase in the rate of mortality in each quinquennial period up to 20 years. The reduction in the ratio among the men of 20 years and upwards arises, no doubt, from the facility of invaliding men of that length of service when their health is giving way and they are unequal to their duties.

It will be observed that the increase in the mortality of the men from 10 to 15 years' service is very trifling over that of the preceding quinquennium. This is, in all probability, the result of the examination to which the men who have completed their first period of service of 10 years in the Infantry or 12 in the Cavalry are subjected previously to re-engagement, by which many men labouring under chronic disease are removed from the ranks. To this process of elimination, therefore, may be attributed the result that the increase in the mortality during that period of service is so very slight.

If the mortality in the different groups of stations be examined separately, it will be seen that there is a decrease in the ratio in the third quinquennial period in all the groups of foreign stations except Australasia. This reduction is, no doubt, owing to the number of men who return to England to take their discharge on the completion of their ten years' service. The exception of Australasia probably depends on the circumstance of the troops there being employed on active service, and the number who claimed their discharge being comparatively small.

The question naturally presents itself, to what is this difference between the law of mortality according to length of service in the French and British armies due? We believe the following essential differences in the constitution and system of the two armies will, to a great extent, explain it.

1. The system of compulsory service in the French army, by which the men are removed from their homes, often unwillingly; are forced to adopt a mode of life for which, in the first instance at least, they have no liking; are compelled to change all their ordinary habits and to adopt others, many of which are not congenial to their tastes; and are congregated in masses in barracks, a circumstance at all times prejudicial to health, but especially so to the young soldier drawn from the rural population. In the British army, on the contrary, the enlistment is a voluntary act, and the class from which the great mass of the recruits is obtained is in such circumstances that the change in the mode of living is usually one of improvement.

2. The proportion of non-commissioned officers (sous-officiers, caporaux et brigadiers) is very much higher among the old soldiers than the young. They are less exposed to the influences which affect the health of soldiers than the privates, and are subject to a lower rate of mortality. On the 1st January, 1863, the proportion of non-commissioned officers to soldiers at each period of service was as follows:—

Under 2 years' service	4·9	per cent.*
2 years and under 6	15·6	"
6 " " 7	18·0	"
7 " " 10	24·8	"
11 " " 13	32·1	"
14 " " 20	33·8	"
20 and upwards	40·0	"

3. It is the practice in the French army to give a number of the soldiers six months' leave of absence (congé de six mois). Any deaths occurring among these men would be included in the mortality of the army; but it must be obvious that during half the year they are removed from the influence of those circumstances which affect injuriously the health of the soldier. But these leaves of absence are granted in a very much larger proportion to the old soldiers than to the young, and this would, of course, tend to reduce the rate of mortality among the former. The number thus on leave is not stated in the "compte rendu" for 1863; but in 1859 it was 64,461 in a force of 550,994, or nearly 12 per cent. We cannot state the number of men at each period

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* Compiled from the "compte rendu sur le recrutement de l'armée pendant l'année 1863."

of service but the following Table,' compiled from the "compte rendu" for 1859, will afford an approximate estimate :—

Number of Men on the Strength of the Army having to serve to—		Number of Men "en congé de six mois" on 1st Jan. 1860, whose Service expires in—		Ratio per 1,000.
31st December, 1860	77,096	1860	3,932	51
" 1861	95,702	1861	17,928	187
" 1862	99,049	1862	17,629	178
" 1863	85,735	1863	13,502	157
" 1864	71,012	1864	2,068	29
" 1865	90,216	1865	1,636	18
" 1866 and upwards	39,549	.. ..		..

The period of service, except in the case of volunteers, being seven years, the lower figures in this Table represent, of course, the younger soldiers; and though, for obvious reasons, the numbers can only be considered as an approximation to the truth, yet the Table shows with sufficient clearness that the proportion of soldiers under four years' service who are granted the six months' leave is very small.

4. We have no information as to the proportion of young soldiers serving in Algeria and Italy; but if, as is probable, this is greater than at home, it would tend to explain the higher rate of mortality among the short-service men, as the proportion of deaths to strength in Italy was nearly double, and in Algeria one-third higher than that of the troops in France.

5. The men who are willing to re-engage on the expiration of the period of compulsory service are, as in the British army, subjected to a careful medical inspection; and to this is, no doubt, in some measure due the reduction in the mortality after seven years' service.

6. There are included in the returns certain corps, as the Gendarmerie, Ouvriers d'Artillerie, &c., who are specially employed, and not exposed to the same deteriorating influences as the troops of the Line. These are mostly, if not exclusively composed of men who have completed their seven years; and the favourable circumstances under which they serve would, of course, assist to reduce the rate of mortality among the men at the higher periods of service.

Such appear to be some of the principal circumstances which tend to produce the anomalous result shown in the French returns, of a decrease in the rate of mortality with length of service and, consequently, with advance of age. In the British army the results are different; and the irregularity in the progressive increase seems to be easily accounted for by the operation of the Limited Enlistment Act.

XV. SUMMARY.

Summary

The following Table gives a general view of the amount of sickness, mortality, and invaliding in the army at home and abroad during the year 1863; and for the purpose of comparison a similar Table is subjoined, showing the results on the average of the three preceding years :—

Summary.

SUMMARY, showing the amount of Sickness, Mortality, and Discharges by Invaliding, in the Army, at Home and Abroad, during the year 1863.

Troops in.	White Troops.							Colonial Corps.*						
	Mean Strength.	Admissions into Hospital.	Deaths.	Discharges by Invaliding.	Annual Ratio per 1,000 of Strength.			Mean Strength.	Admissions into Hospital.	Deaths.	Discharges by Invaliding.	Annual Ratio per 1,000 of Strength.		
					Admitted.	Died.	Discharged as Invalids.					Admitted.	Died.	Discharged as Invalids.
United Kingdom	75,945	72,908	673	2,474	960	8·86	32·58							
Mediterranean	15,010	11,196	100	249	746	6·66	16·59	594	496	6	..	835	10·09	..
British America	15,457	9,987	142	193	646	9·19	12·49							
West Indies	1,860	1,830	17	39	984	9·14	20·97	2,183	1,926	41	32	882	18·78	9·1
Western Africa	..	..	..	..	..	..	..	1,323	1,818	52		1,374	39·30	
St. Helena	624	513	5	2	822	8·00	3·20							
Cape of Good Hope	4,297	3,616	48	97	841	11·14	22·57							
Mauritius	1,978	1,288	26	23	651	13·10	11·63							
Ceylon..	884	1,358	26	31	1,536	29·41	35·07	1,438	1,422	19	17	989	13·20	11·8
Australasia	6,567	3,774	146	122	575	22·23	18·58							
China	2,464	4,970	148	45	2,017	60·06	18·26	1,562	1,842	31	..	1,179	19·85	..
India	67,525	110,357	1,596	1,366	1,634	23·64	20·23							
On board Ship†	5,787	4,503	35	..	778	6·05	..	168	128	4	..	762	23·80	..
Total	198,398	226,300	2,962	4,641	1,141	14·93	23·39	7,268	7,632	153	..	1,050	21·05	..

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* Under this head are included only such colonial corps as are not composed of natives of Great Britain. The Canadian Rifles and the St. Helena Regiment are included in the first division of the Table.

† The deaths of invalids on their passage home are not included under this head, as they are accounted for among the deaths of the stations from which they were invalided.

Summary.

SUMMARY showing the Amount of Sickness, Mortality, and Discharges by Invaliding in the Army at Home and Abroad during the three Years 1860-2.

Troops in.	White Troops.							Colonial Corps*						
					Annual Ratio per 1,000 of Strength.							Annual Ratio per 1,000 of Strength.		
	Aggregate Strength.	Admissions into Hospital.	Deaths.	Discharges by Invaliding.	Admitted.	Died.	Discharged as Invalids.	Aggregate Strength.	Admissions into Hospital.	Deaths.	Discharges by Invaliding.	Admitted.	Died.	Discharged as Invalids.
United Kingdom	264,831	271,410	2,476	9,817	1,025	9·35	37·07							
Mediterranean	46,863	38,860	438	648	829	9·35	13·83	1,820	1,456	10	..	800	5·49	..
British America	28,239	18,013	259	299	638	9·17	10·59							
West Indies	5,670	5,593	57	86	986	10·05	15·17	10,742	10,046	286	276	935	26·62	25·69
Western Africa	..	..	..	..	..	..	..							
St. Helena	1,838	1,654	20	10	900	10·88	5·44							
Cape of Good Hope	13,359	11,486	146	207	860	10·93	15·49							
Mauritius	5,856	4,963	158	74	847	26·98	12·64							
Ceylon..	2,697	3,915	53	41	1,452	19·65	15·20	4,449	5,268	56	87	1,184	12·59	19·55
Australasia	15,073	9,508	222	166	631	14·73	11 01							
China	17,547	33,272	1,012	233	1,896	57·67	13·28	10,128	17,638	298	..	1,741	29·42	..
India	185,250	336,864	6,012	2,699	1,818	32·45	14·57							
On board Ship†	10,844	6,480	177	..	598	16·32	..							
Total	598,067	742,018	11,030	14,280	1,241	18·44	23·88	27,139	34,408	650	..	1,268	23·95	..

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* Under this head are included only such Colonial Corps as are not composed of natives of Great Britain. The Canadian Rifles, the St. Helena Regiment, and the Newfoundland Companies, are included in the first division of the Table.

† The deaths of invalids on their passage home are not included under this head, as they are accounted for among the deaths of the stations from which they were invalided.

Summary.

The results for 1863 are very satisfactory, as they show the admissions into hospital to have been 100 and the deaths 3·51 per 1,000 under the average of he three preceding years, while there has also been a trifling decrease in the proportion discharged the service as invalids. Compared with the results for .862, there has been a decrease in all these particulars, showing that the improvement in the sanitary condition of the army is still progressive.

FRENCH ARMY.

In the volume for 1862, we gave a brief summary of the report which had just been published of the sickness and mortality in the French army for the same year. The following information, compiled from the report for 1863, will probably be interesting to the medical officers of the British army:—

In 1863, the effective strength of the army in France was 294,149, and the average number present was 246,453. The cases which came under treatment in hospital, infirmary, and quarters amounted to 577,232, or 2,345 per 1,000 of strength present, and the deaths to 2,712, or 9·22 per 1,000 of effective strength. The average number constantly sick was 13,321, or 54·05 per 1,000 present; the mean sick-time to each soldier present, therefore, was 19·73 days, and the average duration of the cases treated was 8·42 days.

In Algeria the effective strength was 53,772, and the average number present 48,171. The cases treated were 128,401, or 2,675 per 1,000 present, and the deaths 661, or 12·29 per 1,000 effective strength. The average number constantly sick was 2,608, or 54·14 per 1,000 present; the average sick-time to each soldier was 19·76 days, and the average duration of the cases 7·41 days.

The effective strength of the army in Italy was 13,776, and the average number present was 13,013. The cases treated amounted to 38,106, or 2,928 per 1,000 present, and the deaths to 247, or 17·92 per 1,000 of the effective strength. The average number constantly sick was 818, or 59·38 per 1,000 present; the mean sick-time to each soldier was 21·67 days, and the average duration of the cases was 7·84 days.

In the French report the diseases by which the admissions into *military* hospitals only were occasioned are stated, and no information is afforded respecting the cases treated in civil hospitals, regimental infirmaries, and in quarters. As the former comprise only one-ninth of the total cases treated, it appears unnecessary to offer any remarks upon them as illustrating the prevalence of disease among the troops. The causes of death, however, are stated fully in the Appendix to the Report. They are classified on a different principle from that adopted in the British army; but with a view to bring them into comparison with each other, we have arranged the deaths among the troops serving in the United Kingdom according to the French classification, and annexed it to the following Table, compiled from that report:—

	Deaths among the—							
	French Troops serving in—			British Troops in United Kingdom.	French Troops serving in—			British Troops in United Kingdom.
	France.	Algeria.	Italy.		France.	Algeria.	Italy.	
Average Strength	294,149	53,772	13,776	75,945	Ratio per 1,000 of Strength.			
I. Fevers	654	282	153	35	2·223	5·244	11·439	·461
II. Eruptive Fevers	79	16	5	9	·269	·298	·374	·119
III. Virulent or Contagious Diseases*	8	1	2	9	·027	·019	·150	·119
IV. Diseases of the Brain and Spinal Cord	107	18	1	31	·363	·335	·075	·408
V. " " Organs of Circulation	75	9	..	68	·255	·167	..	·895
VI. " " " Respiration	932	122	34	312	3·169	2·269	2·541	4·108
VII. " " " Digestion	301	115	34	59	1·023	2·139	2·541	·777
VIII. " " Kidneys	17	..	1	12	·058	..	·075	·158
IX. " " Bladder	7	..	..	..	·024	..	..	..
X. " " Genital Organs	6	..	..	1	·020	..	..	·013
XII. " " Bones	54	5	2	11	·183	·093	·149	·145
XIII. " " Articulations	29	3	..	4	·099	·056	..	·053
XIV. " " Nervous System	39	2	1	24	·133	·037	·075	·316
XV. " " Lymphatic "	11	..	1	1	·037	..	·075	·013
XVI. " " Muscles	2	..	..	..	·007	..	..	..
XVII. " " Cellular Tissue	6	3	..	7	·020	·056	..	·092
XVIII. " " Skin	11	3	..	8	·037	·056	..	·105
XIX. Various Diseases	29	7	..	15	·099	·130	..	·197
XX. Other causes { Suicides	133	26	7	23	·452	·483	·523	·303
Accidents	114	37	6	41	·388	·688	·449	·540
Murders	6	..	..	1	·020	..	..	·013
Executions	..	2	..	1	..	·037	..	·013
XXI. Cause unknown	92	10	..	1	·313	·186	..	·013
	2,712	661	247	673	9·219	12·293	18·466	8·861

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* The fatal diseases in this class have been constitutional syphilis, scurvy, and carbuncle.

The most striking difference in the mortality of the troops serving in France and the United Kingdom is the high relative ratio of deaths by fevers, diseases of the organs of digestion, and by suicide in the French army; and by diseases of the organs of circulation and respiration, and of the nervous system in the United Kingdom.

The ratio of deaths from typhoid fever among the troops serving in France amounted to 1·83 per 1,000. It is stated to have prevailed epidemically in the garrisons of Marseilles, Clermont-Ferrand, Angers, Paris, Dijon, Montpellier, Limoges, Tarbes, Toulon, Lyons, and Douai. The high ratio of deaths by fevers in Algiers and Italy was chiefly the result of pernicious intermittent fever, but the mortality by typhoid was also considerable, amounting in Italy to 3·55 per 1,000. Dysentery and Diarrhœa were the principal diseases of the organs of digestion, and next to them peritonitis.

The great mortality by diseases of the organs of respiration is the result of consumption. In the French report it is stated that the deaths returned under the head of chronic bronchitis were in reality caused by phthisis. If the deaths by consumption, spitting of blood, and chronic bronchitis be classed together, the ratio of mortality in the French army serving in France was 2·24, and among troops serving in the United Kingdom, 3·17 per 1,000 of the strength. In diseases of the brain, spinal cord, and nervous system, the excess in the British army is most marked in the deaths by apoplexy and palsy, while in the French army there is a high ratio of mortality by insanity. Two deaths are also recorded in the latter service from nostalgia.

Among the accidental deaths in the French army seven are stated to have been the result of duels; 72 men were drowned, being in the ratio of 0·24 per 1,000, while among the troops in the United Kingdom it amounted to 0·47 per 1,000; and one man was killed by lightning.

Ninety-two deaths are returned under the head of "Cause unknown," among the troops serving in France, and only one among those in the United Kingdom.

RUSSIAN ARMY.

In the Russian "Military Journal," No. 2, for 1863, a paper by Captain Iliashevitch was published, containing a considerable amount of information respecting the mortality in the Russian army for a period of fifteen years—from 1841 to 1852, exclusive of 1848 and 1849, and from 1857 to 1861. The reason for the omission of 1848–9 is not stated, but the four years, 1853–6, are omitted, as the results would be completely exceptional on account of the Crimean War.

It appears that records of death are kept in the Inspector's Department, and in the Army Medical Department of the War Ministry; but these have nothing in common, and are not available as checks on each other. It is stated that deaths in marching regiments, formerly very numerous, were never shown in the Inspector's returns, and only in the medical returns if they occurred in hospital, otherwise they were not recorded at all. It must be obvious, therefore, that the mortality as shown in the paper is considerably understated.

The strength and deaths, so far as the latter were recorded, are shown in the following Table.

	Strength.	Deaths.	Ratio per 1,000.
1841	831,781	34,920	42·0
1842	824,606	32,564	39·5
1843	831,250	27.866	33·5
1844	797,502	27,253	34·2
1845	907,207	33,660	37·1
1846	930,308	35,030	37·6
1847	951.832	39,006	41·0
1850	957,698	38 925	40·6
1851	939,130	32,728	34·9
1852	929,145	29,841	32·1
Total for 10 years	8,900,459	331,793	37·0
1857	990,245	26,861	27·1
1858	937,683	17,250	18·4
1859	919,060	14,274	15·5
1860	892,971	14,608	16·4
1861	862,002	13,821	15·5
Total for 5 years	4,601,961	86,814	18·7
Total for 15 years	13,502,420	418,107	31·0

This Table shows the mortality during the first ten years to have averaged 37·0, and during the last five years 18·7 per 1,000 of the strength. The author attributes the very high rate of mortality during the first period, not to the effect of climate, but to the defective organization of the Russian military system previously to the Crimean War.

One of the circumstances contributing to a high rate of mortality is the system of raising the troops by a levy. "On entering the army the recruit found everything alien to him, even the language, and his preliminary drill was insupportable to his constitution. The sudden change in his mode of life and the hardness of the service led to the sacrifice of his life at an early age."

In support of this opinion, it is stated that the mortality in the reserve division of the Caucasian corps, which was annually supplied with recruits destined ultimately for the army of the Caucasus, amounted on the average of the ten years included in the first period under review to 44·6, or 7½ per 1,000 above the general proportion of the army.

Another prejudicial circumstance is the system of quartering and provisioning the army, most of the troops being billeted on the inhabitants, who also supply their meals; and the soldier, consequently, in seasons of scarcity, suffers with the civil population.

The influence of this on the mortality of the army is corroborated by the fact that "among the population the greatest mortality prevails in the western provinces and in the kingdom of Poland. It gradually falls off towards the east; and this applies equally to our troops. The frequent occurrence of bad harvests and the extreme poverty of the population of the western provinces as compared with the more eastern, were circumstances which, aggravated by the then system of purveyance, materially influenced the rates of mortality among the soldiers stationed in that portion of the Empire."

The Russian fast, which is observed in March and the beginning of April, is also believed to exercise an injurious influence on the health. Certain it is that April is the month in which the mortality reaches the maximum.

Another very important circumstance, which contributed to the high rate of mortality, was that, when men became unfit for duty in the ranks of the active force from chronic diseases, they were not discharged, but were transferred to the garrisons, the military police, and the invalid companies, where they tended to swell the death-rate of the army. In eight years (1841-7 and

1852) previous to 1853, there were 92,374 men told off in this manner from the ranks of the active force as unfit for general service, and of these only 15,812, or 17 per cent., were allowed to return to their homes, the remainder being drafted as above. So great was the influence of this upon the mortality, that in the 10th district, Military Police, the deaths on the average of ten years amounted to 79 per 1,000 of their strength. The report states that "the palpable reason (of this excessive mortality) is that the 10th district of this corps, lying within the radius of location of considerable military forces, received a very large proportion of disabled men."

Another cause to which the sickness and mortality of the troops is attributed in the report is the imposition of Government labour upon the soldiers; and in illustration of this the following Table is given of the mortality among the men so employed.

	Number of Men at Work.	Died.	Ratio per 1,000.
The 18th Division, employed in 1841 in cutting the Canal between the Moskoa and the Volga Rivers ..	11,189	470	42·0
Esthonian Regiment employed in the Citadel of Warsaw	3,346	152	45·6
13th Division in Sebastopol*	16,000	1,538	96·1
17th Division, employed in 1843 in cutting the Moscow Canal	14,685	731	49·8
Three Regiments of the 13th Division in Kief	15,261	614	40·1

It is also stated that the distance between the hospitals and the billets of the troops, and the want of confidence in hospital treatment among the soldiers generally, tend to prevent the men reporting themselves sick till their diseases have assumed a dangerous character, when they are removed to the hospital by the authorities, and contribute to increase the rate of mortality in the army.

The concentration of large masses of troops for manœuvring and other purposes is also mentioned as a cause of mortality, but the only instance adduced in the report does not bear out this opinion, as the mortality on that occasion amounted to 30 per 1,000, while the general ratio for the year (1845) was 37·1 per 1,000.

Among the causes which have tended to reduce the proportion of deaths during the years 1857-61 may be noted the discharge of 600,000 soldiers, after the Crimean War, as it embraced "all feeble-bodied men either disabled in the war or exhausted by earlier diseases." During the same period, also, a great change has taken place in the system of disposing of men who are deemed unfit for active service. While before 1853 only 17 per cent. of the men were removed from the service, since 1857 the proportion has been 48 per cent.

A Table is given in the report showing the mortality in the different branches of the service in each year. The following are the results for the two periods under review:—

---

* The year is not stated, but it was in the period before 1853.

	Field Troops.			Artillery.						Engineers, exclusive of Battalions of Sappers.		
				District Artillery of Forts.			In Arsenals, Powder Mills, and Small Arm Factories.					
•	Aggregate Strength.	Total Deaths.	Ratio per 1,000.	Aggregate Strength.	Total Deaths.	Ratio per 1,000.	Aggregate Strength.	Total Deaths.	Ratio per 1,000.	Aggregate Strength.	Total Deaths.	Ratio per 1,000.
Ten Years, ending 1852 ..	6,280,854	240,199	38·2	183,996	7,526	38·9	137,587	3,989	29·0	89,540	2,639	29·5
Five " " 1861 ..	3,282,487	62,390	19·0	109,399	1,884	17·2	100,698	1,741	17·5	61,687	940	15·3

	Local Force.			Troops of the Interior.						Marching Companies of Invalids.		
				Military Police.			Corps of Gens d'Armes.					
Ten Years, ending 1852 ..	465,078	13,203	28·4	1,192,205	44,873	37·6	46,310	759	16·1	155,841	6,047	38·5
Five " " 1861 ..	245,490	3,987	16·2	640,171	11,797	18·4	23,632	334	14·2	78,059	2,012	25·8

This Table shows the reduction in the mortality to have taken place in all the descriptions of force, but to a very trifling extent in the Gendarmerie, in which the ratio had previously amounted to less than half the average of the other troops. The mortality is still, as might be expected, greatest in the companies of invalids, and the high ratio in the Military Police depends, no doubt, on the circumstance already noticed of the transfer to this arm of men unfit for service in the field troops.

Dividing the force more strictly into arms of the service, except the field troops, the mortality in each respectively has been as follows :—

	Ratio of Deaths per 1,000 of Strength.	
	Ten Years ending 1852.	Five Years ending 1861.
Cavalry	22·6	18·7
Artillery	27·4	15·1
Sappers	33·8	14·1
Infantry { Line	42·4	20·6
Infantry { Rifles	30·5	12·4
Field Troops in general ..	32·4	19·0

A Table is given showing the mortality among the troops serving in the Caucasus, in Poland, and in Lithuania, of which the following are the general results :—

	Army of the Caucasus.		Troops in Kingdom of Poland.		Troops in Lithuania.	
	Ten Years ending 1852.	Five Years ending 1861.	Ten Years ending 1852.	Five Years ending 1861.	Ten Years ending 1852.	Five Years ending 1861.
Aggregate strength ..	1,406,933	937,092	684,304	162,060	556,739	115,525
Total Died	96,589	27,895	33,745	3,251	21,501	1,411
Total Killed in action ..	8,204	1,000	..	..	..	..
Ratio per 1,000 { Died ..	68·6	29·8	49·3	20·1	38·6	12·2
Ratio per 1,000 { Killed	5·8	1·1	..	..	..	..

"Our losses in the Caucasus," says the reporter, "previous to the Crimean War were, as we see, very considerable, and seriously affected the mortality throughout all the army. Taking the average numerical strength of the Caucasian force for that period at 150,000 men, and the mean loss by death at 10,000, it follows that in the course of fifteen years it perished entirely, and not a single man survived to retire on unlimited furlough. On making allowances for furloughs, discharges, and for men removed for disability, the result is that the entire composition of this army is renewed every eight, or at the utmost every ten years. . . . . In the army of the Caucasus we discover a repetition of the well-known fact, that the deaths from naturalcauses bear a very large proportion to the numbers killed in action.

The information respecting the amount of sickness in the army, as shown by the admissions into hospital, is very defective ; but it is estimated by the author of the report at 527 per 1,000 of the strength annually.

The mean daily sick is stated to amount only to 32·7 per 1,000 ; but "as we have included in the strength both the irregular troops and the military educational establishments, where the percentage of sick is comparatively low we must suppose that the above average ratios fall below the actual figures."

The mean daily sick in the army of the Caucasus is stated at 90·5 per 1,000, and among the troops in Finland at 43 per 1,000. The causes of death are not stated in the report, except those by violence or accident, which were as follows:—

	Eight Years, 1841–7, and 1852.		Five Years, 1857–61.	
	Deaths.	Ratio per 1,000 of Strength.	Deaths.	Ratio per 1,000 of Strength.
Homicide	834	·12	645	·14
Suicide	1,687	·22	762	·17
Accidents	2,649	·38	1,520	·33
Found dead	1,089	·16	701	·17

The nature of the fatal accidents was as follows:—

	First Period.	Second Period.
Drowned	1,953	1,248
Frozen to death	175	98
Crushed and suffocated ..	276	99
Killed by lightning	54	27
„ „ horse kicks	191	48

And the modes in which suicide was committed are stated to have been:

	First Period.	Second Period.
By Fire Arms	561	305
„ Cutting Instruments ..	112	59
„ Suspension	1,014	398

The author thus concludes his report: "A great many improvements have latterly been introduced into our military system, which have ameliorated the condition of the army; but although the benefit has been great, it cannot be said they leave nothing more to be desired."

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APPENDIX No. I.

Abstract, showing the Admissions into Hospital, Deaths among the Troops, and Invaliding in the United Kingdom in 1863.

	Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry.			Cavalry Depôts.			Roy. Art. Depôt Brigade.			Infantry Depôt Battalions.		
Strength	1,216			9,436			10,155			1,167			4,108			24,331			961			3,593			15,852		
Diseases.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
I. *Zymotic Diseases.*																											
1. Miasmatic:																											
Variola	13	1	..	13	..	..	7	..	..	1	..	..	31	3	..	21	1	..	..	..	..	3	..	..	26	1	..
Varioloides	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	..
Varicella	..	..	..	1	..	..	2	..	..	..	..	..	11	..	..	..	..	..	1	..	..	..	..	..	5	..	..
Morbilli	1	..	..	9	1	..	8	..	..	..	..	..	2	..	..	13	..	..	..	..	..	1	..	..	20	..	..
Scarlatina	2	..	..	3	..	..	3	..	..	..	..	..	2	..	..	11	1	..	..	..	..	1	..	..	59	..	..
Tonsillitis	70	..	..	311	..	..	275	..	..	30	..	..	150	..	..	557	..	2	68	..	..	245	..	..	755	..	2
Influenza	..	..	..	125	..	..	91	..	..	8	..	..	66	..	..	277	..	..	9	..	..	43	..	..	238	1	..
Ophthalmia.. ..	7	..	..	98	..	2	132	..	..	31	..	..	37	..	1	583	..	42	29	..	..	35	..	..	546	..	28
Erysipelas	3	..	..	19	..	..	18	..	..	1	..	..	15	..	..	56	3	..	2	..	..	7	1	..	58	2	1
Furunculus.. ..	10	..	..	146	..	..	187	..	..	17	..	..	40	..	..	218	..	..	35	..	..	79	..	..	175	..	..
Anthrax . ..	..	..	..	2	..	..	7	..	..	..	..	..	1	..	..	13	1	..	4	..	..	1	..	..	15	..	1
Dysenteria Acuta ..	..	..	..	5	..	..	2	..	..	..	..	..	..	..	..	9	..	1	1	..	..	3	..	..	16	2	..
„ Chronica	..	..	..	..	..	..	18	2	..	..	..	..	..	..	..	24	..	3	4	..	..	5	1	..	17	1	1
Diarrhœa	15	..	..	134	..	..	142	..	..	19	..	..	96	..	..	235	1	..	15	..	..	38	..	..	226	3	3
Febris Intermittens	..	..	..	26	..	..	77	..	..	5	..	1	..	..	..	187	1	6	3	..	..	49	..	..	142	..	2
„ Remittens ..	..	..	..	1	..	..	4	..	..	3	..	..	..	..	..	4	..	..	..	..	..	7	..	..	8	..	..
„ Typhoides ..	1	2	..	3	2	..	2	1	..	..	..	..	5	2	..	3	..	..	1	1	..	3	1	..	6	..	..
„ Typhus ..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..	..	..	..	1	1	..	2	1	..
„ Continua ..	12	..	..	157	2	1	165	1	..	18	..	..	158	..	1	419	7	..	25	..	..	69	1	..	429	2	..
Rheumatismus Acut.	43	..	..	249	..	1	263	..	..	54	..	..	138	..	..	608	..	3	12	..	..	80	..	..	855	1	2

Rheumatismus Chron.	12	..	..	229	1	19	210	..	..	24	..	2	83	..	10	503	..	67	57	..	6	46	..	..	428	..	36
Parotitis	3	..	..	2	..	..	6	..	..	..	..	..	..	..	..	6	..	..	..	..	..	1	..	..	23	..	..
Coryza	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Diphtheria	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vaccinia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	6	..	..
2. Enthetic:																											
Syphilis Primaria	78	..	..	1072	..	..	1148	..	..	178	..	..	679	..	..	2393	..	..	112	..	..	367	..	..	1104	..	..
„ Secundaria	15	..	..	418	1	11	347	1	..	75	..	4	137	..	5	794	3	33	47	..	..	117	..	..	472	..	17
Iritis Syphilitica	3	..	..	24	..	2	19	..	..	..	..	..	12	..	..	43	..	2	1	..	..	4	..	..	15	..	..
Bubo	19	..	..	232	..	..	236	..	..	45	..	..	97	..	..	731	1	1	23	..	..	64	..	..	345	1	..
Gonorrhœa	46	..	..	879	..	..	1265	..	..	151	..	..	300	..	..	2418	..	..	141	..	..	607	..	..	1747	..	..
Phymosis, &c.	2	..	..	13	..	..	12	..	..	1	..	..	4	..	..	31	..	..	1	..	..	4	..	..	33	..	..
Orchitis (Gonorrhœal)	6	..	..	73	..	..	64	..	..	6	..	..	67	..	..	169	..	3	5	..	..	20	..	..	112	..	..
Strictura Urethræ	1	..	..	50	..	2	24	..	..	2	..	..	9	..	..	73	..	7	9	..	..	7	..	..	52	..	5
Verrucæ	..	..	..	7	..	..	14	..	..	10	..	..	10	..	..	83	..	..	2	..	..	15	..	..	38	..	..
Ulcus Penis	..	..	..	3	..	..	4	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Cachexia Syphiloidea	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	..	2	..	..	..	..	..	..	..	..	..
Ophthalmia (Gon:)	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
3. Dietic:																											
Scorbutus	1	..	..	..	..	..	2	..	..	..	..	..	..	..	..	6	..	1	..	..	..	..	..	..	7	..	1
Purpura	..	..	..	1	..	..	1	..	..	1	..	..	1	..	..	3	..	..	..	..	..	1	..	..	2	..	..
Ebriositas	5	..	..	33	..	..	108	1	..	5	..	..	30	..	..	105	..	1	3	..	..	16	..	..	163	1	..
Bronchocele	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	3	..	..
4. Parasitic:																											
Porrigo	..	..	..	27	..	..	7	..	..	..	..	..	13	..	..	48	..	..	4	..	..	1	..	..	39	..	..
Scabies	18	..	..	382	..	..	350	..	..	41	..	..	222	..	..	790	..	..	127	..	..	169	..	..	906	..	..
Tænia Solium	..	..	..	4	..	..	19	..	..	18	..	..	3	..	..	26	..	..	..	..	..	1	..	..	14	..	..
Hydatis Hepatis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Vermes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Ascaris Lumbricoides	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	3	..	..
Phthiriasis	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..
Pediculi	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	..
Aphthæ	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	2	..	..

Appendix No. I.—*continued.*

	Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry.			Cavalry Depôts.			Roy. Art. Depôt Brigade.			Infantry Depôt Battalions.		
Strength	1,216			9,436			10,155			1,167			4,108			24,831			961			3,593			15,852		
Diseases.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
II. *Constitutional Diseases.*																											
1. Diathetic:																											
Podagra	5	..	..	5	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	..	..	..	..	..
Lumbago	3	..	..	13	..	..	28	..	..	3	..	..	8	..	..	32	..	..	..	..	..	4	..	..	17	..	..
Anæmia	..	..	..	3	..	..	2	..	..	1	..	..	2	..	..	2	..	2	3	..	..	1	..	..	11	..	1
Anasarca	..	..	..	4	1	2	3	..	..	..	..	..	2	..	..	10	1	1	1	1	..	..	..	..	21	4	1
Tumores	..	..	..	5	..	2	2	..	..	..	..	..	6	..	..	11	..	1	..	..	..	3	..	..	4	..	..
Carcinoma	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	2	..	1	..	..	..	..	..	..	2	2	1
Scirrhoma	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Lupus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Gangræna	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
2. Tubercular:																											
crofula	..	..	..	43	..	17	44	..	..	7	..	1	23	..	15	66	..	28	..	..	..	9	..	..	46	..	20
nthisis Pulmonalis	6	2	16	76	18	43	88	17	..	9	2	5	51	12	34	241	58	160	4	..	1	48	11	..	149	52	82
Hæmoptysis ..	4	..	..	12	..	2	10	..	..	4	..	..	17	1	4	60	4	4	1	..	..	15	..	..	37	2	4
Abscessus Psoanus..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	3	..	..	..	..	..	..	..	..	..
Morbus Coxarius ..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	3	..	2	..	..	..	..	..	..	3	1	..
Tuberculosis ..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..
III. *Local Diseases.*																											
1. Nervous System:																											
Encephalitis ..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	8	..	2	..	..	..	..	..	..	4	3	1
Meningitis	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	5	3	1

Apoplexia	..	..	..	1	2	..	1	2	..	..	..	..	..	..	..	8	6	..	..	..	..	..	..	..	5	5	..
Paralysis	3	..	..	19	3	10	15	1	..	2	..	1	4	1	..	30	7	19	..	..	..	4	1	..	27	5	11
Delirium Tremens ..	9	..	..	5	..	..	9	..	..	1	..	..	2	..	..	33	2	..	1	..	..	1	..	..	22	1	..
Mania	..	..	..	1	..	3	2	..	..	..	..	..	..	..	..	2	..	2	2	..	1	2	..	..	17	..	7
Amentia	2	..	..	12	..	10	3	..	..	..	..	..	..	..	..	12	..	6	2	..	..	8	..	..	41	..	24
Epilepsia	1	..	..	28	..	6	12	1	..	7	..	3	10	..	4	54	..	21	2	..	2	10	..	..	78	..	33
Convulsio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	2	..	..
Tetanus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Cephalæa	1	..	..	34	..	1	20	..	..	5	..	..	8	..	..	50	1	2	3	..	..	9	..	..	54	..	5
Neuralgia	2	..	..	10	..	1	8	..	..	1	..	..	8	..	..	33	..	..	1	..	..	7	..	..	25	..	..
Dysecœa	..	..	..	3	..	..	7	..	..	1	..	..	..	..	..	13	..	9	1	..	..	1	..	..	9	..	6
Otitis	1	..	..	23	..	1	30	..	..	7	..	..	14	..	3	76	..	2	4	..	..	21	..	..	100	..	5
Iritis..	..	..	..	3	..	..	1	..	..	..	..	..	..	..	..	10	..	..	..	..	..	..	..	..	3	..	..
Cataractes	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	3	..	3	..	..	..	..	..	..	1	..	1
Choroiditis	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Odontalgia	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hysteria	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Catalepsia	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Myopia	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	2	..	3	..	..	..	..	..	..	8	..	5
Vertigo	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	..	..	1	..	..	..	..	..
Fistula Lachrymalis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Chorea	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	3	..	1
Amaurosis	..	..	..	..	..	1	4	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	2	..	2
Cæcitas	..	..	..	..	..	1	1	..	..	1	..	1	..	..	1	5	..	5	..	..	..	..	..	..	11	..	9
Steatoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Nyctalopia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Glaucoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Sclerotitis	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Strabismus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Hydrops Oculi ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Congestio Cerebri ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
2. Circulatory Syst:																											
Carditis	..	..	..	3	..	..	..	..	..	..	..	..	1	..	..	20	..	..	..	..	..	..	..	..	14	..	1
Pericarditis	..	..	..	6	1	2	4	1	..	..	..	1	..	..	1	5	1	..	..	..	..	1	..	..	8	3	2
Hypertrophia Cordis	1	1	1	7	..	3	9	..	..	..	..	..	3	..	..	46	1	29	2	..	..	3	..	..	23	..	17

Appendix No, I.—*continued.*

	Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry.			Cavalry Depôts.			Roy. Art. Depôt Brigade.			Infantry Depôt Battalions.		
Strength	1,216			9,436			10,155			1,167			4,108			24,331			961			3,593			15,852		
Diseases.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Atrophia Cordis ..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	2
Degeneratio „	..	..	..	..	1	..	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Aneurisma „ ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Morbus Valv: „ ..	1	1	..	16	4	7	27	3	..	7	..	..	4	1	5	83	8	43	1	..	1	23	2	..	78	7	29
Morbus „ ..	2	..	..	..	..	..	..	..	..	..	..	..	7	2	3	13	1	3	3	..	..	..	..	..	15	..	5
Aneurisma Aortæ ..	..	..	..	..	1	..	..	..	..	..	1	..	2	3	..	2	7	1	..	..	..	..	1	..	..	2	1
„	..	..	..	5	1	..	7	1	..	..	..	..	..	1	..	3	4	3	1	..	..	1	..	..	4	4	..
Varix	1	..	1	7	..	10	11	..	..	2	..	1	7	..	2	33	..	32	..	..	..	3	..	..	25	..	21
Syncope	2	..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..
Angina Pectoris ..	..	..	..	2	..	1	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..
Palpitatio	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	5	..	..	..	..	..	..	..	..	28	..	6
Arteritis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Phlebitis	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..
3. Respiratory Syst:																											
Laryngitis	..	..	..	4	..	..	2	..	..	..	..	..	..	..	..	3	1	..	..	..	..	..	..	..	3	1	1
Bronchitis Acuta ..	46	..	..	320	4	2	484	1	..	80	..	..	277	..	1	1075	7	3	22	..	..	195	..	..	971	5	1
„ Chronica	3	..	..	78	1	3	108	2	..	13	..	4	62	1	10	278	7	59	31	..	1	72	2	..	266	5	36
Pleuritis	2	..	..	23	..	..	30	..	..	8	..	..	17	1	3	65	2	12	2	..	..	6	..	..	46	2	1
Empyæma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..
Pneumonia	1	1	..	31	4	1	31	3	..	1	..	..	13	..	..	86	10	4	5	..	..	13	3	..	100	9	4
Pleuropneumonia ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Apoplexia Pulmonalis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..

Asthma	..	..	..	4	..	1	15	..	..	1	..	..	4	..	..	13	..	4	..	..	..	3	..	..	10	..	4
Emphysema	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Epistaxis	..	..	..	3	..	1	..	..	..	3	..	..	..	..	..	9	..	..	..	..	..	2	..	..	7	..	..
Pleurodynia	..	..	..	..	..	..	4	..	..	..	..	..	3	..	..	3	..	..	..	..	..	..	..	..	5	..	..
4. Digestive System:																											
Glossitis	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..
Stomatitis	..	..	..	1	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	6	..	..
Pharyngitis	..	..	..	3	..	..	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..
Gastritis	1	..	..	6	..	..	1	..	..	..	..	..	..	1	..	9	1	..	..	..	..	..	..	..	7	3	1
Enteritis	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..
Peritonitis	..	..	..	1	..	..	3	1	..	..	..	..	1	..	..	5	2	..	..	..	..	1	..	..	..	..	..
Obstipatio	..	..	..	2	..	..	5	..	..	..	..	..	2	..	..	28	..	..	..	..	..	7	..	..	41	..	..
Dyspepsia	37	..	..	95	..	1	145	..	..	15	..	2	56	..	1	289	..	3	20	..	..	46	..	..	242	..	2
Colica	7	..	..	17	..	..	39	..	..	3	..	..	26	..	..	69	..	..	..	..	..	7	..	..	74	..	..
Hæmatemesis	..	..	..	..	..	..	4	1	..	1	..	..	..	..	..	8	1	..	1	..	..	2	..	..	4	1	1
Hernia	..	..	..	17	..	11	19	..	..	10	..	6	6	..	1	40	..	31	1	..	..	9	..	..	43	..	20
Hæmorrhois	4	..	..	50	..	..	39	..	..	6	..	..	8	..	..	134	..	..	4	..	..	10	..	..	73	..	5
Prolapsus Ani	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..
Fistula in Ano	..	..	..	2	..	1	7	..	..	..	..	..	1	..	..	14	..	1	..	..	..	2	..	..	12	..	2
Splenitis	..	..	..	1	..	..	2	..	..	2	..	..	..	..	..	6	1	1	..	..	..	1	..	..	6	..	1
Hepatitis Acuta	1	1	..	13	1	..	4	..	..	1	..	..	2	1	..	10	3	1	1	..	..	2	..	..	11	..	..
„ Chronica	..	..	..	8	1	2	28	3	..	3	..	..	..	..	1	90	3	18	9	1	1	11	2	..	90	6	20
Cirrhosis	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Icterus	3	..	..	30	..	..	27	..	..	2	..	..	9	..	..	84	..	..	9	..	..	9	..	..	51	1	..
Chololithus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Ascites	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	4	1	1	1	1	..	..	..	..	5	1	1
Melæna	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
5. Urinary System:																											
Nephritis	1	..	..	..	..	..	7	..	..	..	..	..	1	..	..	8	..	..	..	..	..	1	..	..	7	1	1
Nephria	1	1	..	..	1	..	3	1	..	..	..	..	6	..	1	8	3	3	..	..	..	5	1	..	11	4	2
Ischuria	..	..	..	1	..	..	4	..	..	..	..	..	3	..	..	1	..	..	..	..	..	1	..	..	2	..	..
Dysuria	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hæmaturia	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	6	..	..	..	..	..	2	..	..	6	..	1
Lithiasis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..

Appendix No. I.—*continued.*

	Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry.			Cavalry Depôts.			Roy. Art. Depôt Brigade.			Infantry Depôt Battalions.		
Strength	1,216			9,436			10,155			1,167			4,108			24,331			961			3,593			15,852		
Diseases.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Cystitis	..	..	..	3	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..
Fistula in Perineo ..	..	..	..	1	..	1	1	..	..	1	..	..	..	..	..	1	..	..	1	..	..	..	..	..	2	..	..
Enuresis	1	..	..	7	..	..	5	..	..	2	..	..	..	..	..	16	..	4	..	..	..	..	..	..	34	..	1
Diuresis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..
Diabetes	..	..	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	..	..	..	3	1	2
Morbus Prostaticus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
Calculus Vesicæ ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	1	..	1
6. Reproductive Syst:																											
Varicocele	1	..	..	1	..	..	2	..	..	2	..	..	6	..	..	8	..	4	..	..	..	..	..	..	4	..	..
Hydrocele	..	..	..	9	..	1	11	..	..	3	..	..	1	..	..	30	..	2	2	..	..	1	..	..	14	..	2
Sarcocele	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..	4	..	..	..	..	..	..	..	..	1	..	..
Orchitis (notGonorr:)	4	..	..	135	..	4	106	..	..	24	..	..	10	..	1	227	..	5	9	..	..	55	..	..	134	..	2
Spermatorrhœa ..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Fungus Testis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
7. Locomotive Syst:																											
Arthritis	..	..	..	12	1	..	6	..	..	..	..	..	3	..	..	19	..	1	..	..	..	..	..	..	20	..	4
Synovitis	..	..	..	2	..	..	18	..	..	2	..	..	8	..	..	19	..	4	..	..	..	9	..	..	34	..	2
Hydrarthrus ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..
Contractura	..	..	..	5	..	3	4	..	..	..	..	..	4	..	8	6	..	6	..	..	1	1	..	..	7	..	11
Periostitis	..	..	..	17	..	1	14	..	..	..	..	..	7	..	..	25	..	4	1	..	..	..	..	..	20	..	3
Exostosis	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..
Caries	..	..	1	5	..	5	5	..	..	..	..	..	..	..	1	3	..	1	..	..	..	2	..	..	4	..	1

Necrosis	..	..	..	..	..	..	3	..	..	..	..	..	2	..	..	3	..	2	..	..	..	..	1	..	6	..	1
Malformatio Pedis..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	7	..	..	..	..	..	..	..	..	..
Atrophia Musculor:	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Curvatura Spinæ ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
8. Integument: Syst:																											
Urticaria	2	..	..	1	..	..	8	..	..	..	..	..	2	..	..	18	..	..	4	..	..	2	..	..	7	..	..
Eczema	3	..	..	49	..	..	52	..	..	4	..	..	42	..	..	111	..	..	1	..	..	15	..	..	126	..	..
Herpes	3	..	..	4	..	..	27	..	..	..	..	..	9	..	..	79	..	..	3	..	..	10	..	..	53	..	..
Impetigo	..	..	..	13	..	..	16	..	..	1	..	..	14	..	..	15	..	..	1	..	..	2	..	..	23	..	..
Psoriasis	2	..	..	19	..	..	26	..	..	2	..	..	3	..	..	84	..	2	6	..	..	12	..	..	64	..	1
Lichen	2	..	..	1	..	..	22	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Acne	1	..	..	1	..	..	8	..	..	3	..	..	1	..	..	14	..	..	2	..	..	2	..	..	10	..	..
Pernio	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pityriasis	..	..	..	1	..	..	1	..	..	..	..	..	2	..	..	2	..	..	4	..	..	..	..	..	4	..	..
Lepra	..	..	..	1	..	..	5	..	..	2	..	..	1	..	..	5	..	1	..	..	..	2	..	..	10	..	2
Ecthyma	..	..	..	5	..	..	31	..	..	..	..	..	1	..	..	11	..	..	..	..	..	2	..	..	19	..	..
Prurigo	..	..	..	18	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Rupia	..	..	..	1	..	..	6	..	..	..	..	..	1	..	..	8	..	..	1	..	..	2	..	..	5	..	..
Tinea Capitis ..	..	..	..	..	..	..	..	..	..	..	..	..	12	..	..	4	..	..	..	..	..	1	..	..	..	..	..
Verrucæ	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	3	..	..
Pemphigus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..
Erythema Mercuriale	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Hordeolum	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..
Ichthyosis	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..
Mentagra	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..
Roseola	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..
Morbus Cutis ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Phlegmon	43	..	..	659	..	..	447	..	..	68	..	..	130	..	1	1094	..	1	59	..	..	140	..	..	970	2	1
Abscessus	47	..	..	131	..	2	168	..	..	10	..	..	96	..	4	300	..	8	6	..	..	86	..	..	208	2	3
Paronychia	..	..	..	54	..	..	75	..	..	10	..	..	9	..	..	94	..	..	8	..	..	18	..	..	97	..	1
Ulcus	27	..	..	651	..	10	524	..	..	46	..	1	108	..	1	815	..	13	38	..	..	203	..	..	699	..	7
IV. *Developmental Diseases.*																											
4. Diseases of Nutrition:																											
Atrophia	..	..	..	3	..	3	25	..	..	1	..	..	1	..	..	32	1	18	..	..	..	9	..	..	62	2	7

Appendix No. I.—*continued.*

	Household Cavalry.			Cavalry.			Royal Artillery.			Military Train.			Foot Guards.			Infantry.			Cavalry Depôts.			Roy. Art. Depôt Brigade.			Infantry Depôt Battalions.		
Strength	1,216			9,436			10,155			1,167			4,108			24,831			961			3,596			15,852		
Diseases.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.	Admitted.	Died.	Invalided.
Debilitas	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Senectus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
V. *Violent Deaths or Diseases.*																											
1. Accidental:																											
Ambustio	..	..	..	14	..	..	28	..	..	6	..	..	6	..	..	78	1	1	..	..	..	5	..	..	46	..	..
Explosio	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gelatio	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Insolatio	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Submersio	..	..	..	..	1	..	2	10	..	..	..	..	..	2	..	2	8	..	..	..	..	..	..	..	..	8	..
Suspendium ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Asphyxia	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Fractura	2	..	..	46	1	10	50	2	..	5	..	1	22	2	3	69	5	12	5	..	..	9	..	..	33	..	5
Amputatio	..	..	..	..	..	1	4	1	..	..	..	..	..	..	..	1	..	3	..	..	..	1	..	..	2	..	1
Contusio	69	..	..	642	1	2	615	1	..	70	..	..	103	..	..	706	..	2	61	..	..	140	..	..	474	..	..
Commotio	2	..	1	1	..	..	3	..	..	2	..	..	..	..	..	2	..	..	1	..	..	..	..	..	3	..	..
Vulnus Sclopetarium	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7	..	7	..	..	..	1	..	..	6	..	1
,, Incisum ..	19	..	..	145	..	..	141	..	..	10	..	..	96	..	1	256	1	3	17	..	..	58	..	..	192	..	3
Luxatura	..	..	..	7	..	1	6	..	..	..	..	..	2	..	..	13	..	2	..	..	..	1	..	..	5	..	..
Subluxatio	14	..	..	150	..	2	194	..	..	30	..	1	87	..	..	432	..	5	8	..	..	45	..	..	288	..	2
Vesiculæ Pedis ..	..	..	..	11	..	..	40	..	..	1	..	..	18	..	..	98	..	1	3	..	..	16	..	..	104	..	..
Venenatio	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..

Morsus Equi ..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
" Canis ..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
" Hominis ..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Homicidal:																											
Ruptura Ilei ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	..	..
Vulnus Incisum ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
4. Suicidal:																											
Vulnus Sclopetarium	..	..	..	1	8	..	..	1	..	..	..	..	1	..	..	2	8	..	..	..	..	..	..	..	1	6	..
" Incisum ..	..	..	..	..	..	..	..	1	..	1	..	..	1	..	..	1	..	..	..	..	..	..	1	..	2	1	..
Suspendium ..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Venenatio	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
5. Executio:																											
Suspendium.. ..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6. Punitus: ..	..	..	..	14	..	..	26	..	..	6	..	..	7	..	..	54	..	..	..	..	..	7	..	..	58	..	..
Simulatio Morbi ..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	..
Cause not ascertained	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..
No appreciable disease	1	..	..	4	..	..	..	..	..	1	..	..	1	..	..	4	..	..	..	..	..	..	..	..	2	..	..
Total ..	771	10	20	8678	61	233	9361	64	..	1279	5	36	3931	36	126	19,043	188	825	1125	5	14	3560	31	..	15,590	175	577

APPENDIX No. II.

Abstract, showing the Number of Men belonging to the Regiments serving at Home who were Vaccinated during the Year 1863.

	Results.	In those who bore Marks of previous Small-pox.	In those who bore good Marks of previous Vaccination.	In those who bore doubtful Marks of previous Vaccination.	In those who bore no Marks of previous Vaccination or Small-pox.	Total.
Soldiers, not Recruits	A perfect vaccine pustule	113	933	227	187	1,460
	A modified ditto	62	493	117	57	729
	A failure in	157	1,218	158	109	1,642
	Total	332	2,644	502	353	3,831
Recruits.	A perfect vaccine pustule	194	1,939	183	259	2,575
	A modified ditto	152	1,317	77	142	1,688
	A failure in	337	2.108	70	68	2,583
	Total	683	5,364	330	469	6,846

APPENDIX No. III.

Abstract, showing the Ages of the Men serving in the different Arms at Home, and the Deaths at each Age in 1863.

	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and upwds.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Household Cavalry	69	..	386	3	289	2	182	1	159	2	131	2	1,216	10
Cavalry of the Line	1,164	3	4,407	19	2,257	17	818	9	503	10	290	3	9,436	61
Royal Artillery ..	1,140	..	3,343	16	3,539	30	1,711	14	343	4	79	..	10,155	64
Military Train ..	139	..	495	2	418	2	76	..	24	1	15	..	1,167	5
Foot Guards.. ..	580	3	1,215	7	1,256	12	667	11	343	1	46	2	4,108	36
Infantry Regiments	2,924	3	9,929	47	5,846	48	3,462	50	1,908	32	262	8	24,331	188
Total	6,016	9	19,775	94	13,615	111	6,911	85	3,280	50	823	15	50,420	364
Cavalry Depôts ..	135	..	812	1	233	1	114	..	82	..	85	3	961	5
Depôt Brigade, R.A.	1,240	..	1,326	8	403	6	267	7	264	7	93	3	3,593	31
Depôt Battalions ..	3,283	14	5,211	34	2,844	29	2,229	43	1,777	35	508	15	15,852	170
Total of Depôts..	4,658	14	6,849	43	3,480	36	2,610	50	2,123	42	686	21	20,406	206
Coast Brigade, R.A.	2	..	25	..	234	1	490	11	428	10	210	3	1,389	25

APPENDIX No. IV.

Abstract, showing the Number of Recruits Inspected, and the Number found unfit for Service in each of the Recruiting Districts during the year 1863.

Districts.		Primary Inspections.	Secondary Inspections.		Total.
			Had been previously examined by Staff Surgeon or other Army Medical Officer.	Had been previously examined by Private Medical Practitioner.	
London ..	Inspected	2,446	182	819	3,445
	Rejected	1,286	38	298	1,622
Liverpool..	Inspected	1,234	55	387	1,676
	Rejected	796	8	173	977
Bristol ..	Inspected	282	49	490	821
	Rejected	112	7	148	267
Leeds ..	Inspected	343	82	322	747
	Rejected	164	12	100	276
Edinburgh	Inspected	579	22	83	684
	Rejected	176	..	9	185
Glasgow ..	Inspected	1,194	1	21	1,216
	Rejected	466	..	3	469
Dublin ..	Inspected	1,371	24	272	1,667
	Rejected	672	5	103	780
Cork ..	Inspected	301	83	111	495
	Rejected	158	7	22	187
Belfast ..	Inspected	341	32	363	736
	Rejected	209	3	95	307
Total	Inspected ..	8,089	530	2,868	11,487
	Rejected ..	4,039	80	951	5,070

APPENDIX No. V.

Abstract, showing the Native Country of the Recruits inspected in each of the Districts in 1863.

	England.		Wales.		Scotland.		Ireland.		British Colonies or Foreign Countries.	
	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.	Inspected.	Rejected.
London ..	3,077	1,463	13	3	77	30	258	118	20	8
Liverpool ..	960	527	25	15	69	43	602	384	20	8
Bristol ..	640	208	69	17	6	3	99	34	7	5
Leeds ..	574	216	1	1	34	12	182	45	6	2
Edinburgh ..	29	12	..	..	568	153	84	19	3	1
Glasgow ..	49	15	..	..	823	331	339	119	5	4
Dublin ..	49	25	..	..	3	..	1,608	752	7	3
Cork.. ..	14	8	1	..	3	1	475	178	2	..
Belfast ..	13	8	..	..	15	9	700	287	8	3
Total ..	5,405	2,482	109	36	1,598	582	4,297	1,936	78	34

APPENDIX No. VI.

Abstract, showing the Number of Recruits Inspected in 1863, at the following Ages and Heights.

Age and Country.	Under 5 ft. 3 in.	From 5 ft. 3 in. to 5 ft. 4 in.	From 5 ft. 4 in. to 5 ft. 5 in.	From 5 ft. 5 in. to 5 ft. 6 in.	From 5 ft. 6 in. to 5 ft. 7 in.	From 5 ft. 7 in. to 5 ft. 8 in.	From 5 ft. 8 in. to 5 ft. 9 in.	From 5 ft. 9 in. to 5 ft. 10 in.	From 5 ft. 10 in. to 5 ft. 11 in.	From 5 ft. 11 in. to 6 ft.	Upwards of 6 ft.	Total.
Boys under 17—												
England ...	188	...	2	...	...	...	...	...	...	...	...	190
Scotland ...	6	2	...	...	...	1	...	...	...	...	...	9
Ireland ...	95	25	12	1	1	...	...	...	...	...	...	134
From 17 to 18—												
England ...	73	40	5	58	130	46	7	1	2	...	1	363
Scotland ...	...	...	1	6	75	6	5	...	...	...	...	93
Ireland ...	...	2	5	32	77	10	1	1	...	...	...	128
From 18 to 19—												
England ...	34	40	86	183	783	346	140	60	10	8	3	1,693
Scotland ...	...	...	...	21	351	136	50	25	5	3	...	591
Ireland ...	...	...	7	38	650	169	54	30	10	2	2	962
From 19 to 20—												
England ...	11	27	51	118	513	299	125	52	22	11	9	1,238
Scotland ...	...	...	...	5	128	95	51	22	10	6	6	323
Ireland ...	...	...	2	15	212	142	98	35	11	2	...	517
From 20 to 21—												
England ...	9	32	69	140	307	180	94	56	19	5	1	912
Scotland ...	...	...	...	...	81	70	48	19	8	3	4	233
Ireland ...	...	...	...	...	154	115	55	31	8	3	...	366
From 21 to 22—												
England ...	3	6	21	85	181	145	78	39	20	13	3	594
Scotland ...	...	...	...	4	52	47	33	12	7	5	2	162
Ireland ...	...	...	...	...	70	56	35	35	13	6	1	216
From 22 to 23—												
England ...	...	7	14	39	181	154	94	61	25	11	6	592
Scotland ...	...	...	...	3	57	49	26	13	8	2	1	159
Ireland ...	...	...	1	...	78	53	35	36	14	5	1	223
From 23 to 24—												
England ...	...	...	6	23	150	116	77	51	20	16	...	459
Scotland ...	...	...	...	1	39	30	17	9	6	5	2	109
Ireland ...	...	...	...	...	50	37	25	16	5	3	...	136
From 24 to 25—												
England ...	...	...	4	14	162	126	77	43	27	14	7	474
Scotland ...	...	...	...	3	55	46	39	24	9	6	3	185
Ireland ...	...	...	...	...	49	34	29	19	12	4	2	149
Upwards of 25—												
England ...	...	...	2	4	46	32	30	26	20	10	4	174
Scotland ...	...	...	...	1	7	12	4	6	...	2	4	36
Ireland ...	...	...	...	...	12	12	8	14	7	11	3	67
Total ...	419	181	288	794	4,651	2,564	1,335	736	298	156	65	11,487

APPENDIX No. VII.

ABSTRACT, showing the Number of Recruits Inspected in 1863, at the following Weights and Ages.

Ages and Country.	Under 100 lbs.	From 100 lbs. to 110 lbs.	From 110 lbs. to 120 lbs.	From 120 lbs. to 130 lbs.	From 130 lbs. to 140 lbs.	From 140 lbs. to 150 lbs.	From 150 lbs. to 160 lbs.	From 160 lbs. to 170 lbs.	From 170 lbs. and upwards.	Total.
Boys under 17—										
England	187	2	1	...	...	...	...	...	...	190
Scotland	5	3	1	...	...	...	...	...	...	9
Ireland	106	19	9	...	...	...	...	...	...	134
From 17 to 18—										
England	15	31	92	139	65	17	3	1	...	363
Scotland	1	3	29	38	14	8	...	...	...	93
Ireland	...	13	46	44	16	9	...	...	...	128
From 18 to19—										
England	3	19	242	577	564	207	65	14	2	1,693
Scotland	3	19	161	225	121	50	10	2	...	591
Ireland	1	8	122	389	302	96	27	10	7	962
From 19 to 20—										
England	1	10	160	360	410	200	70	22	5	1,238
Scotland	...	5	46	109	93	45	17	8	...	323
Ireland	...	4	35	173	173	84	31	12	5	517
From 20 to 21—										
England	...	4	44	203	407	155	71	25	3	912
Scotland	...	1	19	51	68	65	21	7	1	233
Ireland	...	...	17	76	94	121	38	16	4	366
From 21 to 22—										
England	...	1	17	116	246	126	55	29	4	594
Scotland	...	2	6	41	42	53	13	5	...	162
Ireland	...	...	10	34	62	63	33	11	3	216
From 22 to 23—										
England	...	1	15	99	199	168	73	28	9	592
Scotland	...	1	11	39	43	42	17	6	...	159
Ireland	...	...	5	26	73	68	34	15	2	223
From 23 to 24—										
England	...	...	8	56	133	132	88	34	8	459
Scotland	...	...	10	15	42	25	12	3	2	109
Ireland	...	2	1	29	47	27	23	5	2	136
From 24 to 25—										
England	...	3	20	72	139	127	71	34	8	474
Scotland	...	3	15	43	42	44	25	7	6	185
Ireland	...	...	1	14	48	43	25	13	5	149
Upwards of 25—										
England	...	...	3	24	39	49	45	9	5	174
Scotland	...	...	...	1	10	16	5	3	1	36
Ireland	...	...	...	5	14	14	21	9	4	67
Total	322	154	1,146	2,996	3,506	2,054	893	328	86	11,487

APPENDIX No. VIII.

Abstract, showing the State of Education of the Recruits examined at the Head Quarters of the Recruiting Districts in 1863.

Districts.	Well Educated.	Able to Write.	Able to Read only.	Unable to Read.	Total.
London	239	1,941	199	1,066	3,445
Liverpool	135	957	183	401	1,676
Bristol	..	549	10	262	821
Leeds	..	459	75	213	747
Edinburgh	10	493	91	90	684
Glasgow	44	692	224	256	1,216
Dublin	1	1,078	51	537	1,667
Cork	135	144	68	148	495
Belfast	1	344	150	241	736
Total	565	6,657	1,051	3,214	11,487
Country:					
England	374	3,906	467	1,942	6,689
Scotland	54	1,185	315	346	1,900
Ireland	137	1,566	269	926	2,898
Total	565	6,657	1,051	3,214	11,487

APPENDIX No. IX.

Abstract, showing the Admissions into Hospital and Deaths among the Troops serving in the Mediterranean in the year 1863.

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,347		5,757		3,906		594	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*								
1. Miasmatic Diseases :								
Varicella	1	..	..	..	..	..	..	..
Morbilli	..	..	2	..	..	..	1	..
Scarlatina	4	..	1	..	3	..	..	..
Tonsillitis	75	..	50	..	77	..	10	..
Influenza..	64	..	26	..	14	..	..	..
Coryza	1	..	1	..	..	..	..	..
Ophthalmia	216	..	449	..	176	..	44	..
Erysipelas	5	..	1	..	3	..	..	..
Furunculus	68	..	22	..	22	..	..	..
Anthrax	18	..	5	..	..	..	..	..
Dysenteria Acuta	13	..	37	2	4	..	..	..
,, Chronica	..	..	16	..	..	..	..	..
Diarrhoea..	178	..	179	1	89	..	16	..
Cholera	..	..	..	..	1	..	..	..
Febris Intermittens	15	..	9	..	42	..	3	..
,, Remittens	36	..	..	..	1	..	..	..
,, Typhoides	9	5	5	2	1	3	..	..
,, Typhus	..	..	1	..	..	..	..	..
,, Continua	606	2	654	4	372	4	11	..
Rheumatismus Acutus	145	..	50	..	52	..	32	..
,, Chronicus	75	1	118	..	39	..	5	..
Parotitis	2	..	..	..	2	..	..	..
2. Enthetic Diseases :								
Syphilis Primaria	120	..	30	..	169	..	5	..
,, Secundaria	47	..	31	..	58	..	3	..
Iritis Syphilitica	3	..	1	..	3	..	..	..
Bubo	30	..	15	..	44	..	1	..
Gonorrhoea	418	..	157	..	155	..	16	..
Phymosis, &c.	3	..	2	..	1	..	1	..
Orchitis (Gonorrhoeal)	29	..	5	..	6	..	..	..
Ophthalmia (Gonorrhoeal)	1	..	..	..	..	..	..	..
Strictura Urethrae	16	..	13	..	13	..	..	..
Verrucae	12	..	..	..	..	..	..	..
Ulcus Penis	2	..	..	..	..	..	..	..
3. Dietic Diseases :								
Purpura	1	..	4	..	..	..	..	..
Ebriositas	111	..	53	2	75	..	1	..
4. Parasitic Diseases :								
Porrigo	3	..	12	..	3	..	..	..
Scabies	10	..	7	..	..	..	3	..
Taenia Solium	36	..	66	..	4	..	1	..
Ascaris Lumbricoides	..	..	1	..	..	..	..	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,347		5,757		3,906		594	
Diseases.	Admitted.	Died.	Admitted	Died.	Admitted.	Died.	Admitted.	Died.
Vermes	..	..	..	..	3	..	..	..
Aphthæ	..	..	..	..	1	..	..	..
II. *Constitutional Diseases.*								
1. Diathetic Diseases:								
Melanosis	1	1	..	..	..	..	..	..
Podagra	1	..	..	..	1	..	..	..
Lumbago	18	..	11	..	..	..	..	..
Anæmia	..	..	9	..	..	..	..	..
Anasarca	..	..	4	1	5	2	1	..
Tumores	6	..	9	..	3	..	..	..
2. Tubercular Diseases:								
Scrofula	11	..	8	..	3	..	1	..
Phthisis Pulmonalis	26	1	52	8	15	5	1	1
Hæmoptysis	12	..	6	..	8	1	..	..
Abscessus Psoanus	1	..	..	1	..	..	..	..
III. *Local Diseases.*								
1. Of the Nervous System:								
Encephalitis	..	..	..	..	..	1	..	..
Meningitis	..	..	1	..	..	..	..	..
Myelitis	1	1	..	..	..	..	..	..
Apoplexia	..	..	..	2	1	1	..	..
Paralysis	6	..	7	..	2	1	..	..
Delirium Tremens	7	1	10	..	6	..	..	..
Mania	2	..	1	..	6	..	2	..
Amentia	6	..	9	..	2	..	..	..
Epilepsia	17	..	10	2	6	..	4	1
Convulsio	2	..	..	..	..	..	3	..
Chorea	..	..	1	..	..	..	..	..
Cephalæa	54	..	6	..	3	..	..	..
Neuralgia	5	..	6	..	5	..	..	..
Dysecœa	4	..	5	..	3	..	..	..
Otitis	15	..	9	..	21	..	3	..
Cæcitas	1	..	3	..	1	..	..	..
Amaurosis	..	..	2	..	1	..	..	..
Entropium	1	..	..	..	..	..	..	..
Fistula Lachrymalis	1	..	1	..	..	..	..	..
Dacryocystitis	..	..	1	..	..	..	..	..
2. Of the Circulatory System:								
Carditis	1	..	..	..	..	..	..	..
Pericarditis	1	..	2	..	2	..	1	..
Hypertrophia Cordis	6	..	3	..	3	..	..	1
Morbus Valv: Cordis	5	2	14	..	6	1	1	..
Degeneratio Cordis	1	..	..	..	..	..	..	..
Palpitatio Cordis	40	..	..	..	..	..	..	..
Angina Pectoris	..	..	1	..	..	..	..	..
Syncope	3	..	..	..	..	..	..	..
Aneurisma Aortæ	1	1	..	..	..	1	..	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops R. Malta Fencibles.	
Strength	5,347		5,757		3,906		594	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Aneurisma	3	..	2	2	..	1	..	..
Atheroma Arteriarum	..	..	..	..	..	1	..	..
Angeioleucitis	1	..	..	..	..	..	..	..
Varix	6	..	8	..	9	..	..	..
3. Of the Respiratory System:								
Laryngitis	4	..	..	..	..	..	..	..
Bronchitis Acuta	224	1	115	..	64	..	47	..
„ Chronica	65	..	58	..	19	..	..	..
Pleuritis	20	..	16	..	7	..	..	..
Pneumonia	12	2	13	2	6	3	..	..
Apoplexia Pulmonalis	..	..	1	..	..	..	..	..
Asthma	8	..	11	..	..	..	..	..
Dyspnœa..	1	..	..	..	..	..	..	..
Emphysema	..	..	2	..	1	..	..	..
Epistaxis	..	..	1	..	2	..	..	..
Pleurodynia	1	..	..	..	..	..	..	..
4. Of the Digestive System:								
Glossitis	..	..	1	..	..	..	..	..
Stomatitis	1	..	..	..	..	..	..	..
Gastritis	2	..	..	..	..	..	9	1
Enteritis	1	..	..	..	1	1	3	1
Peritonitis	4	..	..	..	1	1	..	..
Obstipatio	10	..	8	..	8	..	..	..
Dyspepsia	118	..	72	..	66	..	104	..
Colica	39	..	12	..	10	..	..	..
Hæmatemesis	5	1	..	..	1	1	..	..
Hernia	12	..	10	..	2	..	..	..
Hæmorrhois	27	..	15	..	22	..	1	..
Fistula in ano	3	..	4	..	3	..	..	..
Prolapsus Ani	1	..	..	..	..	..	..	..
Splenitis	5	..	1	..	1	..	..	..
Hepatitis Acuta	8	1	7	..	4	..	1	..
„ Chronica	11	..	16	..	10	1	..	..
Icterus	23	2	19	2	10	..	..	..
Ascites	..	..	2	..	..	..	1	..
Melæna	2	..	..	..	..	..	..	..
5. Of the Urinary System:								
Nephritis..	1	..	3	1	1	..	1	..
Nephria	..	..	2	1	..	..	..	..
Albuminuria	2	..	..	..	..	..	..	..
Ischuria	2	..	3	..	..	..	..	..
Hæmaturia	1	..	..	..	1	..	..	..
Cystitis	1	..	2	..	..	..	..	..
Fistula in Perineo	..	..	1	..	..	..	..	..
Enuresis	2	..	2	..	13	..	..	..
6. Of the Reproductive System:								
Varicocele	1	..	1	..	3	..	..	..
Hydrocele	10	..	5	..	..	..	..	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles.	
Strength	5,347		5,757		3,906		594	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Orchitis (not Gonorrhœal)	86	..	62	..	16	..	..	..
Spermatorrhœa	1	..	..	..	..	..	..	..
7. Of the Locomotive System:								
Arthritis	4	..	8	..	..	..	..	..
Synovitis	13	..	7	..	1	..	..	..
Contractura	4	..	3	..	..	..	..	..
Periostitis	2	..	12	..	3	..	..	..
Exostosis	..	..	1	..	..	..	..	..
Necrosis	..	..	3	..	..	..	..	..
Curvatura Spinæ	2	..	..	..	..	..	..	..
8. Of the Integumentary System:								
Urticaria	3	..	2	..	3	..	..	..
Eczema	11	..	8	..	19	..	..	..
Herpes	9	..	9	..	3	..	6	..
Impetigo	2	..	3	..	12	..	..	..
Psoriasis	13	..	17	..	9	..	..	..
Lichen	2	..	2	..	..	..	..	..
Ecthyma	1	..	1	..	..	..	..	..
Pemphigus	2	..	..	..	..	..	..	..
Pityriasis	1	..	..	..	3	..	..	..
Rupia	1	..	..	..	1	..	..	..
Hordeolum	1	..	..	..	..	..	..	..
Prurigo	..	..	1	..	..	..	..	..
Roseola	..	..	1	..	..	..	..	..
Lepra	..	..	1	..	4	..	..	..
Acne	..	..	..	..	1	..	..	..
Phlegmon	333	..	305	..	240	..	..	..
Abscessus	129	..	67	..	23	..	70	..
Paronychia	25	..	21	..	8	..	..	..
Ulcus	197	..	185	..	127	..	18	..
IV. *Developmental Diseases.*								
4. Diseases of Nutrition:								
Atrophia	18	..	18	..	21	..	..	..
Senectus	..	..	2	..	..	..	..	..
Malformatio	..	..	1	..	..	..	..	..
V. *Violent Deaths or Diseases.*								
1. Accidental:								
Ambustio	5	..	6	..	9	..	..	..
Explosio	..	..	..	..	1	1	..	..
Insolatio	..	..	1	..	1	..	..	..
Submersio	..	1	..	1	1	..	..	..
Fractura	18	2	22	..	14	..	1	..
Amputatio	..	..	1	..	..	..	1	..
Contusio	247	..	199	..	178	..	40	..
Commotio	..	..	4	1	..	..	..	..
Vulnus Sclopetarium	1	..	3	..	..	..	1	..
„ Incisum	101	..	74	..	74	..	19	..
Luxatura	6	..	4	..	4	..	..	..

Appendix No. IX.—*continued.*

Stations	Gibraltar.		Malta.		Ionian Islands.		Native Troops. R. Malta Fencibles	
Strength	5,347		5,757		3,906		594	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Subluxatio	107	..	109	..	86	..	..	..
Vesiculæ Pedis	43	..	18	..	4	..	..	..
3. Homicidal:								
Vulnus Incisum	..	..	..	..	..	..	1	1
4. Suicidal:								
Fractura	..	..	..	1	..	..	..	..
Amputatio Digitorum	1	..	..	..	..	..	..	..
Suspendium	..	..	..	..	..	..	1	..
Vulnus Incisum	1	..	1	..	..	..	..	..
Vulnus Sclopetarium	..	..	..	3	..	..	..	..
6. Punitus	29	..	22	..	6	..	1	..
No Appreciable Disease	6	..	1	..	..	..	..	..
Total	4,691	25	3,832	39	2,673	30	496	6

CAUSES of the Deaths among the Invalids.

	From Gibraltar.	From Malta.	From the Ionian Islands.
Phthisis Pulmonalis	1	2	..
Abscessus Psoanus	1	..	..
Morbus Valv. Cordis	..	..	1
Bronchitis Chronica	..	1	..
Total	2	3	1

APPENDIX No. X.

Abstract, showing the Diseases of the Men sent home as Invalids from the Mediterranean during the Year 1863, and of those finally discharged the Service.

Stations	Gibraltar.			Malta.			Ionian Islands.		
Average Strength ..	5,347			5,757			3,906		
Sent Home for ..	Discharge.	Change of Climate.	Discharged at Invalid Depôt.	Discharge.	Change of Climate.	Discharged at Invalid Depôt.	Discharge.	Change of Climate.	Discharged at Invalid Depôt.
I. *Zymotic Diseases.*									
1. Miasmatic.									
Ophthalmia	..	4	5	10	27	39	..	..	1
Diarrhœa	..	1	1	..	2	2	..	..	..
Febris Intermittens ..	..	..	1	..	..	1	..	..	..
„ Remittens ..	..	1	1	..	..	..	..	..	..
„ Typhoides ..	..	1	..	..	..	..	..	..	..
„ Continua.. ..	..	4	2	..	..	..	..	2	..
Rheumatismus Acutus ..	..	..	..	1	2	..	1	1	..
„ Chronicus	..	2	5	2	5	4	..	1	..
2. Enthetic:									
Syphilis Secundaria ..	..	4	8	1	1	3	..	..	1
Iritis Syphilitica ..	..	..	..	..	..	..	1	1	1
Bubo	..	1	..	..	..	..	..	..	..
Strictura Urethræ ..	..	2	1	1	..	..	2	..	1
4. Parasitic:									
Tænia Solium	..	1	..	..	..	..	..	..	..
II. *Constitutional Diseases.*									
1. Diathetic:									
Anasarca	..	..	..	..	..	..	..	1	..
Tumores	..	..	..	1	..	..	..	..	..
2. Tubercular:									
Scrofula	..	3	2	..	2	1	..	..	..
Phthisis Pulmonalis ..	3	15	20	19	1	24	6	8	4
Hæmoptysis	..	5	2	1	..	..	2	..	..
Abscessus Psoanus ..	..	1	..	..	..	..	..	..	..
III. *Local Diseases.*									
1. Nervous:									
Paralysis	1	1	1	2	1	3	..	..	1
Mania	..	1	..	1	..	..	2	..	..
Amentia	3	3	1	1	1	..	1	..	..
Epilepsia	2	2	2	3	..	3	2	..	1
Cephalæa	..	..	2	..	..	..	..	..	..
Dysecœa	1	1	1	1	..	2	..	..	1
Otitis	..	1	1	..	..	..	..	..	..
Cataractes	1	..	..	..	..	..	..	..	..
Cæcitas	3	..	..	2	..	1	..	1	3
Entropium	1	..	..	..	..	..	..	..	..
Amaurosis	..	..	1	1	..	..	1	..	..

Appendix No. X.—*continued.*

Stations	Gibraltar.			Malta.			Ionian Islands.		
Average Strength ..	5,347			5,757			3,906		
Sent Home for ..	Discharge.	Change of Climate.	Discharged at Invalid Depôt.	Discharge.	Change of Climate.	Discharged at Invalid Depôt.	Discharge.	Change of Climate.	Discharged at Invalid Depôt.
2. Circulatory:									
Hypertrophia Cordis ..	1	1	4	1	..	2	1	1	1
Morbus Valv: Cordis ..	1	..	5	6	..	4	2	2	7
Aneurisma Aortæ ..	..	..	..	..	..	..	1	..	..
,, ...	..	3	..	..	..	..	..	..	..
Varix	1	1	3	3	..	2	7	..	3
Palpitatio Cordis ..	2	4	1	..	..	..	..	..	..
3. Respiratory:									
Bronchitis Acuta ..	..	..	..	..	..	..	..	4	..
,, Chronica ..	1	9	5	1	5	4	2	7	1
Pleuritis	..	..	..	1	..	1	..	..	..
Pneumonia	..	..	1	..	..	..	..	..	..
Asthma	..	3	4	..	..	2	..	..	..
Epistaxis..	..	..	..	..	..	..	..	1	..
Dyspnœa..	..	1	..	..	..	..	..	..	..
4. Digestive:									
Dyspepsia	..	4	2	1	1	1	..	..	1
Hernia	2	..	3	1	..	1	..	..	1
Fistula in Ano	..	..	..	1	..	1	..	..	..
Splenitis	..	..	1	..	..	1	..	..	..
Hepatitis Acuta.. ..	..	1	..	..	..	..	..	..	..
,, Chronica ..	1	2	2	1	1	1	..	2	2
Icterus	..	..	..	1	..	..	..	..	..
Ascites	..	..	..	..	..	1	..	..	..
5. Urinary:									
Nephria	1	..	..	..	..	..	..	..	..
Hæmaturia	..	1	..	..	..	..	..	..	..
Fistula in Perineo ..	..	..	..	..	1	..	..	..	1
Enuresis	..	1	..	..	..	..	..	1	..
6. Reproductive:									
Hydrocele	..	1	..	..	..	..	..	..	..
7. Locomotive:									
Synovitis..	1	..	1	..	..	..	..	..	..
Contractura	..	..	..	2	..	2	..	..	..
Necrosis	..	..	..	..	1	1	..	..	..
Curvatura Spinæ ..	2	..	..	..	..	..	..	..	..
Malformatio	1	..	..	1	..	..	..	..	..
Atrophia Musculorum ..	..	..	..	..	..	..	1	1	..
8. Integumentary:									
Impetigo..	..	..	..	..	..	..	..	1	..
Phlegmon	..	..	..	..	..	..	..	1	..
Abscessus	..	..	..	2	..	2	1	..	..
Paronychia	..	..	..	..	..	..	..	..	..
Ulcus	..	1	2	2	2	2	..	1	1

Appendix No. X—*continued.*

Stations	Gibraltar.			Malta.			Ionian Islands.		
Average Strength ..	5,347			5,757			3,906		
Sent Home for ..	Discharge.	Change of Climate.	Discharged at Invalid Depot.	Discharge.	Change of Climate.	Discharged at Invalid Depot.	Discharge.	Change of Climate.	Discharged at Invalid Depot.
IV. *Developmental Diseases.*									
4. Diseases of Nutrition:									
Debilitas	..	..	2	..	..	3	..	..	..
Atrophia	1	2	..	3	1	..	..	..	..
Senectus	1	..	..	1	..	..	..	..	..
V. *Violent Deaths or Diseases.*									
1. Accidental:									
Fractura	2	1	2	2	1	3	2	..	..
Amputatio	..	..	1	..	..	..	..	..	..
Contusio	..	..	..	..	..	2	..	..	..
Vulnus Sclopetarium ..	..	1	1	..	..	..	1	..	1
,, Incisum	..	..	..	..	1	..	..	..	..
Subluxatio	..	..	..	..	..	..	..	2	..
4. Suicidal:									
Vulnus Incisum	..	..	..	1	..	..	..	..	..
Total	33	91	97	78	56	119	36	34	33

APPENDIX No. XI.

ABSTRACT, showing the Ages of the Troops serving in the Mediterranean Commands, and the Deaths at each Age, during the Year 1863.

Regiments.		Under 20 Years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
		Strength on 1st Jan.	Deaths during Year.	Strength on 1st Jan.	Deaths during Year.	Strength on 1st Jan.	Deaths during Year.	Strength on 1st Jan.	Deaths during Year.	Strength on 1st Jan.	Deaths during Year.	Strength on 1st Jan.	Deaths during Year.
Mediterranean Commands	Royal Artillery	82	..	796	2	618	2	292	3	71	2	18	..
	Royal Engineers	60	..	250	..	277	2	88	1	34	..	2	..
Gibraltar ..	2nd Battalion 2nd Regiment..	29	..	561	..	199	4	43	..	4	1	2	..
	2nd „ 3rd „ ..	28	1	594	3	164	..	30	..	5	1	..	..
Gibraltar and Malta	2nd Battalion 7th Regiment..	14	..	438	..	266	2	107	..	15	..	3	..
	2nd „ 8th „ ..	43	..	547	2	169	1	71	..	11	1	3	..
	2nd „ 15th „ ..	21	1	456	4	211	2	107	3	21	2	7	..
	2nd „ 23rd „ ..	18	..	425	1	298	1	109	..	16	1	7	..
	100th Regiment	36	..	393	2	255	1	111	1	9	..	..	..
	4th Battalion Rifle Brigade..	51	..	465	1	262	2	74	1	4	..	3	..
Malta	1st Battalion 22nd Regiment	66	..	298	..	226	3	112	3	108	..	26	1
	2nd „ 22nd „	22	..	401	1	252	..	115	..	25	..	11	1
	1st „ 25th „	22	..	309	3	296	4	83	..	59	2	6	..
Ionian Islands ..	2nd Battalion 4th Regiment..	50	..	570	2	148	4	53	1	10	1	2	..
	2nd „ 6th „ ..	47	..	545	2	181	..	57	..	2	..	..	..
	1st „ 9th „ ..	26	1	385	3	301	1	92	3	35	..	2	..
	2nd „ 9th „ ..	32	..	478	3	242	1	83	..	16	1	..	..
Total		647	3	7,906	29	4,360	29	1,627	16	445	12	87	2

APPENDIX No. XII.

Abstract showing the Admissions into Hospital and Deaths among the Troops serving in British America in the year 1863.

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland.	
Average Annual Strength	1,172		3,096		10,764		318	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*								
1. Miasmatic Diseases:								
Variola	..	..	..	..	19	..	1	..
Morbilli	..	..	1	..	2	..	..	..
Scarlatina	..	..	..	..	4	..	..	..
Tonsillitis	12	..	85	..	265	..	4	..
Influenza	15	..	84	..	85	..	4	..
Ophthalmia	23	..	44	..	137	..	1	..
Erysipelas	..	..	4	..	20	2	..	..
Furunculus	2	..	30	..	62	..	..	..
Anthrax	..	..	5	1	7	..	..	..
Dysenteria Acuta	3	1	1	..	6	1	..	..
„ Chronica	..	..	..	..	3	..	..	..
Diarrhœa	42	..	23	..	189	..	1	..
Cholera Biliosa	..	..	..	..	6	..	..	..
Febris Intermittens	1	..	4	..	55	..	..	..
„ Remittens	2	..	..	..	8	..	..	..
„ Typhoides	..	..	..	..	4	1	..	..
„ Continua	180	..	28	..	173	6	..	..
Rheumatismus Acutus	23	..	31	..	159	..	7	..
„ Chronicus	8	..	61	..	84	..	4	..
Parotitis	..	..	..	..	20	..	..	..
Diphtheria	..	..	..	..	..	..	2	..
2. Enthetic Diseases								
Syphilis Primaria	18	..	117	..	984	..	2	..
„ Secundaria	8	..	35	..	217	..	7	..
Iritis Syphilitica	..	..	2	..	6	..	..	..
Bubo	4	..	29	..	165	..	..	..
Gonorrhœa	29	..	187	..	582	..	..	..
Phymosis, &c.	1	..	3	..	8	..	..	..
Orchitis (Gonorrhœal)	8	..	9	..	43	..	..	..
Strictura Urethræ	..	..	5	..	40	..	..	..
Verrucæ	1	..	9	..	15	..	..	..
Ulcus Penis	..	..	..	..	5	..	..	..
3. Dietic Diseases:								
Scorbutus	..	..	..	..	1	..	..	..
Purpura	..	..	..	..	6	..	..	..
Ebriositas	54	1	37	2	177	2	8	..
Bronchocele	..	..	..	..	1	..	..	..
4. Parasitic Diseases:								
Porrigo	3	..	3	..	3	..	..	..
Scabies	..	..	56	..	41	..	1	..
Tænia Solium	..	..	1	..	..	..	..	..
Vermes	..	..	..	..	1	..	..	..

Appendix No. XII.—*continued.*

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland.	
Average Annual Strength ..	1,172		3,096		10,764		318	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*								
1. Diathetic Diseases:								
Podagra	..	..	..	..	7	..	1	..
Lumbago	8	..	..	..	10	..	..	..
Anæmia..	..	..	..	..	8	..	..	..
Anasarca	..	..	..	..	2	..	..	..
Tumores	..	..	..	..	1	..	..	..
Carcinoma	..	..	..	..	1	..	..	..
Cachexia	..	..	..	..	1	..	..	..
2. Tubercular Diseases:								
Scrofula..	3	..	6	..	7	..	..	..
Phthisis Pulmonalis ..	16	1	2	..	64	13	1	..
Hæmoptysis	1	..	8	..	18	1	..	..
Tuberculosis	..	..	..	..	1	..	..	..
III. *Local Diseases.*								
1. Nervous:								
Encephalitis	..	..	..	..	3	3	..	..
Apoplexia	..	..	..	..	2	3	..	..
Paralysis	..	..	2	1	16	..	..	..
Delirium Tremens ..	17	2	3	2	42	9	1	..
Mania	1	..	..	..	2	..	..	..
Amentia	..	..	6	..	7	..	1	..
Epilepsia	5	..	5	..	10	..	..	..
Convulsio	..	..	1	..	..	..	..	..
Cephalæa	6	..	4	..	17	..	..	..
Neuralgia	1	..	3	..	20	..	..	..
Dysecœa	..	..	1	..	5	..	..	..
Otitis	11	..	3	..	23	..	..	..
Iritis	1	..	..	..	1	..	..	..
Sclerotitis	1	..	..	..	2	..	..	..
Cæcitas	1	..	..	..	4	..	..	..
Amaurosis	..	..	..	..	2	..	..	..
Myopia	..	..	..	..	1	..	..	..
Choroiditis	..	..	1	..	..	..	..	..
Ptosis	..	..	..	..	1	..	..	..
2. Circulatory:								
Carditis..	..	..	..	..	1	..	..	..
Pericarditis	..	..	2	2	2	1	..	..
Hypertrophia Cordis ..	1	..	2	..	4	2	1	..
Morbus Valv: Cordis ..	2	..	3	1	22	7	..	..
Aneurisma Aortæ ..	..	2	..	..	1	1	..	..
Aneurisma	..	..	..	..	1	2	..	..
Varix	..	..	..	..	6	..	..	..
Phlebitis	..	..	..	..	1	..	..	..
3. Respiratory:								
Laryngitis	1	..	..	..	..	..	..	..
Œdema Glottidis ..	..	..	..	..	1	..	..	..
Bronchitis Acuta ..	27	1	70	2	418	1	3	..

Appendix No. XII.—*continued.*

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland.	
Average Annual Strength ..	1,172		3,096		10,764		318	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Bronchitis Chronica ..	8	..	40	..	101	..	2	..
Pleuritis..	11	2	7	..	48	1	2	..
Empyema	..	..	..	..	1	1	..	..
Pneumonia	..	..	15	1	158	7	1	..
Asthma..	..	..	2	..	7	..	..	..
Epistaxis	..	..	..	..	1	..	..	..
Pleurodynia	..	..	3	..	10	..	..	..
4. Digestive:								
Stomatitis	..	..	1	..	..	..	..	..
Gastritis	..	..	1	1	4	..	..	..
Enteritis	..	..	1	..	2	..	..	..
Peritonitis	..	..	1	..	2	1	..	..
Obstipatio	..	..	1	..	7	..	..	..
Dyspepsia	22	..	23	..	148	..	1	..
Colica	7	..	38	..	24	..	..	..
Gastrodynia	..	..	..	..	1	..	..	..
Hæmatemesis	1	..	2	1	7	..	..	..
Hernia	1	..	2	..	7	..	..	..
Hæmorrhois	6	..	22	..	86	..	..	..
Fistula in Ano.. ..	4	..	1	..	7	..	..	..
Hepatitis Acuta ..	3	..	1	..	9	1	3	..
„ Chronica ..	..	..	..	..	7	1	3	..
Icterus	1	..	8	..	40	..	1	..
Ascites..	..	..	..	..	2	1	..	..
5. Urinary:								
Nephritis	..	..	..	..	2	1	1	..
Nephria	..	..	..	..	6	2	..	..
Ischuria	1	..	..	..	1	..	..	..
Hæmaturia	..	..	1	..	1	..	..	..
Fistula in Perineo ..	..	..	..	..	1	..	..	..
Enuresis	3	..	1	..	3	..	..	..
Urethritis	..	..	..	..	1	..	..	..
Morbus Prostaticus ..	..	..	..	..	5	..	..	..
6. Reproductive:								
Hydrocele	1	..	..	..	4	..	..	..
Orchitis(notGonorrhœal)	5	..	19	..	72	..	..	..
7. Locomotive:								
Arthritis	1	..	2	..	11	..	..	..
Synovitis	..	..	2	..	16	..	..	..
Contractura	..	..	..	..	2	..	..	..
Periostitis	..	..	3	..	17	..	..	..
Caries	..	..	..	..	..	..	1	..
Necrosis..	..	..	..	..	1	..	1	..
8. Integumentary:								
Eczema	2	..	10	..	21	..	..	..
Herpes	1	..	11	..	17	..	..	..
Impetigo	..	..	2	..	1	..	1	..

Appendix No. XII.—*continued.*

Stations	Bermuda.		Nova Scotia.		Canada.		Newfoundland.	
Average Annual Strength ..	1,172		3,096		10,764		318	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Psoriasis	1	..	7	..	24	..	..	..
Prurigo	2	..	..	..	1	..	..	..
Pityriasis	1	..	..	..	1	..	..	..
Lepra	2	..	..	..	2	..	..	..
Pernio	1	..	..	..	..	..	..	..
Ecthyma	..	..	1	..	..	..	..	..
Pemphigus	..	..	1	..	..	..	..	..
Rupia	..	..	1	..	5	..	..	..
Sycosis	..	..	1	..	..	..	..	..
Mentagra	..	..	..	..	1	..	..	..
Acne	..	..	..	..	3	..	..	..
Phlegmon	29	..	144	..	526	..	5	..
Abscessus	4	..	15	..	110	..	..	..
Paronychia	2	..	1	..	29	..	..	..
Ulcus	35	..	87	..	388	..	..	..
IV. *Developmental Diseases.*								
4. Diseases of Nutrition:								
Atrophia	1	..	2	..	7	..	..	..
Debilitas	..	..	..	..	2	..	..	..
V. *Violent Deaths or Diseases.*								
1. Accidental:								
Ambustio	3	..	13	..	88	..	2	..
Gelatio	..	..	5	..	36	1	2	..
Insolatio	..	..	1	..	..	1	..	..
Submersio	..	..	1	9	..	14	..	..
Asphyxia	..	..	..	..	..	1	..	..
Fractura	5	..	9	..	48	4	1	..
Amputatio	1	..	1	..	1	..	..	..
Contusio	58	..	89	..	374	..	7	..
Commotio	..	..	1	..	1	1	..	..
Vulnus Sclopetarium ..	1	..	..	..	5	..	1	..
„ Incisum ..	14	..	44	..	231	..	10	..
Luxatura	1	..	4	..	11	..	..	..
Subluxatio	22	..	56	..	245	..	6	..
Vesiculæ Pedis.. ..	4	..	8	..	15	..	..	..
Per Vias Ferreas ..	..	..	..	..	..	1	..	..
Venenatio	..	..	..	..	1	..	..	..
Morsus Equi	..	..	..	..	2	..	..	..
„ Canis	..	..	..	..	..	..	1	..
2. Suicidal:								
Vulnus Incisum ..	..	..	..	..	1	2	..	..
„ Sclopetarium ..	..	..	..	..	..	1	1	..
3. Punitus	2	..	8	..	12	..	..	..
Diseases not specified ..	..	..	..	..	9	..	..	..
Total ..	802	10	1,736	23	7,318	96	103	..

Appendix No. XII.—*continued.*

CAUSES of the Deaths of the Invalids.

Diseases.	Bermuda.	Nova Scotia, &c.	Canada.	Newfoundland.
Phthisis Pulmonalis ..	3	2	3	1
Apoplexia	..	..	1	..
Paralysis	..	..	1	..
Morbus Valv: Cordis ..	..	..	1	..
Hepatitis Chronica ..	..	..	1	..
Total	3	2	7	1

APPENDIX No. XIII.

Abstract, showing the Number of Invalids sent Home from British America, and of Men finally discharged the service as Invalids in British America, and at the Invalid Depôt in England in the year 1863.

Diseases.	Sent home as Invalids from				Discharged the Service as Invalids.		
	Bermuda.		British America.		At Invalid Depot in England.		In British America.
	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.	From Bermuda.	From British America.	
I. *Zymotic Diseases.*							
1. Miasmatic:							
Tonsillitis	..	1	..	..	..	..	..
Ophthalmia	..	4	2	..	5	5	..
Febris Intermittens	..	..	..	..	..	..	1
Rheumatismus Chron:	..	..	3	9	..	9	..
2. Enthetic:							
Syphilis Secundaria	..	2	4	15	2	12	1
Strictura Urethræ	..	..	2	3	..	3	..
3. Dietic:							
Bronchocele	..	1	..	..	..	..	..
II. *Constitutional Diseases.*							
1. Diathetic:							
Lumbago	..	1	..	..	..	..	..
Cachexia	..	..	..	3	..	..	..
2. Tubercular:							
Scrofula	..	..	2	..	1	3	..
Phthisis Pulmonalis	2	6	27	5	6	26	4
Hæmoptysis	..	..	1	2	..	2	..
III. *Local Diseases.*							
1. Nervous:							
Meningitis	..	..	1	..	..	1	..
Paralysis	..	..	6	..	..	6	1
Mania	1	..	1	..	..	..	..
Amentia	..	..	8	1	..	4	..
Epilepsia	1	..	6	..	..	5	2
Cephalæa	..	1	..	..	..	..	..
Neuralgia	..	..	..	1	..	..	..
Dysecœa	1	2	1	..	..	1	..
Otitis	..	..	2	..	2	1	..
Cæcitas	..	1	4	..	..	..	..
Amaurosis	1	..	1	..	..	1	2
Sclerotitis	..	..	..	1	..	..	..
2. Circulatory:							
Carditis	..	..	..	..	..	1	..
Pericarditis	..	..	1	..	..	1	..
Hypertrophia cordis	..	..	1	1	2	2	1
Morbus Valv: Cordis	2	3	8	1	2	9	1
Varix	..	..	1	..	..	1	1
3. Respiratory:							
Bronchitis Acuta	..	..	..	1	..	..	..
" Chronica	..	..	8	12	1	7	..
Pleuritis	..	..	..	2	..	2	..
Pneumonia	..	..	1	1	..	4	..

Appendix No. XIII.—*continued.*

Diseases.	Sent home as Invalids from				Discharged the Service as Invalids.		
	Bermuda.		British America.		At Invalid Depôt in England.		In British America.
	For Discharge.	Change of Climate.	For Discharge.	Change of Climate.	From Bermuda.	From British America.	
Asthma	..	..	1	1	..	..	..
Epistaxis	..	..	..	1	..	..	..
Emphysema	..	..	..	..	..	1	..
4. Digestive:							
Dyspepsia	..	..	..	2	..	1	..
Hæmatemesis	..	..	..	1	..	1	..
Hernia	..	..	12	..	..	5	..
Hæmorrhois	..	..	..	..	..	..	1
Fistula in ano	..	2	..	2	..	2	..
Hepatitis Chronica	..	..	1	1	..	2	..
5. Urinary:							
Nephritis	..	..	..	..	..	2	..
Nephria	..	..	3	..	..	..	..
Fistula in Perineo	..	..	..	..	1	..	..
Morbus Prostaticus	..	..	..	1	..	1	..
6. Reproductive:							
Orchitis (not Gon:)	..	..	..	1	..	2	..
7. Locomotive:							
Arthritis	..	..	..	3	..	..	..
Synovitis	..	..	..	1	..	3	..
Hydrarthrus	..	..	..	..	..	..	1
Contractura	..	..	..	3	..	4	1
Periostitis	..	..	1	2	..	..	..
Caries	..	..	..	..	..	2	..
8. Integumentary:							
Abscessus	..	1	2	..	..	1	..
Ulcus	..	1	3	4	..	4	1
IV. *Developmental Diseases.*							
4. Diseases of Nutrition:							
Atrophia	..	..	2	..	..	..	1
Debilitas	..	..	..	..	..	2	..
V. *Violent Deaths or Diseases.*							
1. Accidental:							
Gelatio	..	..	3	..	..	..	2
Fractura	1	..	5	..	1	5	..
Amputatio	..	..	1	..	..	2	..
Contusio	..	..	1	..	..	..	..
Vulnus Sclopetarium	..	..	..	..	..	..	2
„ Incisum	..	..	1	..	..	..	..
Subluxatio	1	..	..	..	1	..	..
2. Suicidal:							
Vulnus Sclopetarium	..	..	1	..	..	..	..
Total	10	26	128	81	24	146	23

APPENDIX No. XIV.

ABSTRACT, showing the Ages of the Troops serving in British America, and the Deaths at each Age during the Year 1863.

Station.	Corps.	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.		Total.	
		Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.	Strength, 1st Jan.	Died.
Bermuda	Royal Artillery ..	10	..	82	..	81	1	34	..	8	..	..	..	210	1
	Royal Engineers ..	7	..	71	1	73	1	24	1	13	1	..	..	188	4
	39th Foot	3	..	268	2	327	4	143	1	40	1	6	..	787	8
Canada, Nova Scotia, and Newfoundland.	Royal Artillery ..	92	..	1,162	6	746	9	366	5	98	2	18	..	2,482	22
	Royal Engineers ..	9	..	45	..	29	..	19	..	8	..	2	..	112	..
	3rd Batt. Mil. Train	3	..	172	2	89	1	21	1	5	..	2	..	292	4
	1st „ Gren. Gds.	28	..	220	1	451	1	107	2	35	1	..	..	841	5
	2nd „ Scots Fusilier Guards	36	..	304	2	380	2	83	..	17	..	2	..	822	4
	1st Batt. 15th Foot.	16	..	378	2	248	3	91	1	39	..	11	1	783	7
	1st „ 16th „	104	..	332	4	188	3	62	..	41	2	12	..	739	9
	2nd „ 16th „	40	..	557	5	143	2	70	2	18	1	4	..	832	10
	1st „ 17th „	23	..	205	1	384	2	109	3	34	..	6	..	761	6
	2nd „ 17th „	95	..	548	5	137	..	48	..	9	..	..	..	837	5
	30th Foot	119	..	368	1	226	2	58	2	24	1	3	..	798	6
	47th „	73	..	299	2	192	1	156	..	26	..	..	..	746	3
	4th Batt. 60th Foot	324	..	361	4	88	2	18	..	10	1	..	..	801	7
	62nd Foot	100	1	246	1	263	3	99	1	25	..	9	..	742	6
	63rd „	98	..	318	4	228	2	67	2	26	1	1	..	738	9
	1st Batt. Rifle Brig.	62	..	331	1	307	2	80	1	19	1	1	..	800	5
	Rl. Canadian Rifles	27	..	16	..	72	..	420	1	373	5	244	10	1,152	16
	Total	1,269	1	6,283	44	4,652	41	2,075	23	863	17	321	11	15,463	137

APPENDIX No. XV.

Abstract, showing the Admissions into Hospital and Deaths among the White Troops serving in the Windward and Leeward Command and Jamaica, in the Year 1863.

Stations	Jamaica.		Subordinate Stations.			Windward and Leeward Command.		Subordinate Stations.							
			New-castle.	Port Royal.	Up Park Camp.			Bar-badoes.		St. Lucia.		Trinidad.		British Guiana.	
Strength	650		393	194	84	1,210		768		55		248		135	
Diseases.	Admitted.	Died.	Admitted.	Admitted.	Admitted.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*															
1. Miasmatic:															
Morbilli	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Tonsillitis	12	..	11	..	10	15	..	13	..	..	..	2	..	..	..
Influenza..	9	..	9	..	..	1	..	..	..	..	..	1	..	..	..
Ophthalmia	24	..	16	5	3	79	..	64	..	..	..	6	..	8	..
Furunculus	10	..	4	..	5	1	..	1	..	..	..	..	..	..	..
Dysenteria Acuta ..	4	..	..	4	..	7	..	7	..	..	..	..	..	..	..
„ Chronica.	..	..	1	..	..	1	..	1	..	..	..	..	..	..	..
Diarrhœa..	35	..	19	17	..	53	..	36	..	4	..	12	..	1	..
Cholera	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..
Febris Intermittens.	36	..	10	18	7	181	..	82	..	7	..	49	..	43	..
„ Remittens ..	64	2	9	2	39	56	2	46	2	1	..	1	1	8	..
„ Continua ..	29	..	19	9	..	9	..	..	..	3	..	6	..	..	..
Rheum: Acutus ..	16	..	8	8	..	15	..	8	..	..	..	7	..	..	..
„ Chronicus ..	1	1	..	..	2	8	..	5	..	..	..	3	..	..	..
2. Enthetic:															
Syphilis Primaria ..	16	..	2	11	3	83	..	80	..	..	..	1	..	1	..
„ Secundaria.	3	..	..	3	..	10	..	7	..	..	..	1	..	1	..
Bubo	9	..	3	3	2	22	..	18	..	3	..	1	..	..	..
Gonorrhœa	30	..	6	23	1	74	..	63	..	3	..	5	..	2	..
Phymosis, &c. ..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Orchitis (Gonorr:) ..	3	..	..	..	1	2	..	2	..	..	..	..	..	..	..
Strictura Urethræ ..	1	..	..	1	..	4	..	2	..	..	..	2	..	..	..
3. Dietic:															
Ebriositas	33	..	12	10	10	34	..	18	..	3	..	11	..	2	..
4. Parasitic:															
Porrigo	1	..	1	..	..	5	..	3	..	..	..	2	..	..	..
Scabies	4	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Tænia Solium.. ..	..	..	..	..	..	2	..	..	..	1	..	1	..	..	..
Vermes	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..
II. *Constitutional Diseases.*															
1. Diathetic:															
Lumbago..	1	..	..	1	..	1	..	1	..	..	..	..	..	..	..
Anæmia	1	..	..	..	..	8	..	3	..	1	..	2	..	2	..
Anasarca..	1	..	1	..	..	1	..	..	..	..	..	1	..	..	..
Tumores	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
2. Tubercular:															
Phthisis Pulmonalis.	7	1	2	5	..	8	2	5	..	..	..	2	2	1	..
Hæmoptysis ..	2	..	..	2	..	2	..	1	..	..	..	..	..	1	..

Appendix No. XV.—*continued.*

Stations	Jamaica.		Subordinate Stations. New-castle.	Subordinate Stations. Port Royal.	Subordinate Stations. Up Park Camp.	Windward and Leeward Command.		Subordinate Stations. Bar-badoes.		Subordinate Stations. St. Lucia.		Subordinate Stations. Trinidad.		Subordinate Stations. British Guiana.	
Strength	650		393	194	84	1,210		768		55		248		135	
Diseases.	Admitted.	Died.	Admitted.	Admitted.	Admitted.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
III. *Local Diseases.*															
1. Nervous:															
Paralysis	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..
Delirium Tremens ..	7	..	..	6	1	8	2	5	1	1	..	2	1	..	..
Amentia	1	..	1	..	..	2	..	2	..	..	..	..	..	..	..
Epilepsia	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..
Convulsio	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Cephalaea	3	..	3	..	..	9	..	5	..	..	..	2	..	2	..
Neuralgia	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..
Dysecoea	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Otitis	5	..	..	..	2	32	..	23	..	..	..	9	..	..	..
Nyctalopia	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Circulatory:															
Morbus Valv: cordis	1	1	1	..	..	6	..	6	1	..	..	..	..	..	..
Aneurisma	1	..	..	1	..	2	..	1	..	..	..	1	..	..	..
Angina Pectoris ..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
3. Respiratory:															
Laryngitis	..	..	..	..	..	2	..	..	..	..	..	2	..	..	..
Bronchitis Acuta ..	36	..	28	6	..	37	1	36	..	..	..	..	..	1	..
„ Chronica	9	..	4	5	..	7	..	5	..	..	..	..	..	2	..
Pleuritis	1	..	1	..	..	7	..	4	..	..	..	3	..	..	..
Pneumonia	5	..	1	3	..	..	..	..	..	..	..	..	..	..	..
Asthma	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Epistaxis	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..
4. Digestive:															
Gastritis	1	..	1	..	..	1	..	..	..	1	..	..	..	..	..
Enteritis	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Peritonitis	..	..	..	..	..	1	1	1	..	..	..	..	..	..	..
Obstipatio	2	..	..	1	1	..	..	..	..	..	..	..	..	..	..
Dyspepsia	9	..	..	8	2	33	..	21	..	7	..	5	..	..	..
Colica	4	..	3	1	..	5	..	5	..	..	..	..	..	..	..
Haematemesis ..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Hernia	1	..	..	1	..	1	..	1	..	..	..	..	..	..	..
Haemorrhois ..	3	..	3	..	..	7	..	3	..	1	..	3	..	..	..
Fistula in Ano ..	1	..	..	1	..	1	..	1	..	..	..	..	..	..	..
Hepatitis Acuta ..	1	..	1	..	..	7	..	5	..	..	..	2	..	..	..
„ Chronica .	..	..	..	..	..	2	..	1	..	..	..	1	..	..	..
5. Urinary:															
Haematuria	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
6. Reproductive:															
Hydrocele	..	..	..	..	..	3	..	3	..	..	..	..	..	..	..
Orchitis (not Gon:) .	..	..	1	..	..	33	..	30	..	..	..	..	..	2	..
7. Locomotive:															
Synovitis	..	..	..	..	..	2	..	2	..	..	..	..	..	..	..
Periostitis	1	..	..	..	1	2	..	2	..	..	..	..	..	..	..

Appendix No. XV.—*continued.*

Stations	Jamaica.		Subordinate Stations.			Windward and Leeward Command.		Subordinate Stations.							
			New-castle.	Port Royal.	Up Park Camp.			Bar-badoes.		St. Lucia.		Trinidad.		British Guiana.	
Strength	650		393	194	84	1,210		768		55		248		135	
Diseases.	Admitted.	Died.	Admitted.	Admitted.	Admitted.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
8. Integumentary:															
Urticaria	3	..	3	..	..	..	..	..	..	..	..	..	..	..	..
Eczema	..	..	..	..	1	23	..	19	..	..	..	4	..	..	..
Herpes	1	..	1	..	..	6	..	5	..	..	..	1	..	..	..
Psoriasis	2	..	..	2	..	15	..	..	..	..	..	15	..	..	..
Acne	10	..	9	..	..	..	..	..	..	..	..	..	..	..	..
Roseola	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..
Phlegmon	35	..	14	17	4	85	..	70	..	..	..	9	..	6	..
Abscessus	7	..	4	2	..	10	..	4	..	6	..	..	..	..	..
Paronychia	1	..	1	2	..	4	..	3	..	..	..	1	..	..	..
Ulcus	36	..	24	8	3	43	..	29	..	6	..	4	..	4	..
IV. *Developmental Diseases.*															
4. Diseases of Nutrition:															
Atrophia	3	..	3	..	..	..	..	..	..	..	..	..	..	..	..
V. *Violent Deaths or Diseases.*															
1. Accidental:															
Ambustio	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..
Explosio	..	..	..	..	..	1	1	..	..	1	1	..	..	..	..
Fractura	2	..	1	1	..	3	..	2	..	1	..	..	..	..	..
Amputatio	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..
Contusio	20	..	16	3	..	67	..	52	..	6	..	5	..	3	..
Vulnus Incisum ..	24	..	8	15	4	25	..	16	..	2	..	3	..	4	..
Luxatura	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..
Subluxatio	9	..	8	..	1	24	..	12	..	5	..	5	..	1	..
Vesiculæ Pedis ..	4	..	1	..	1	1	..	1	..	..	..	..	..	..	..
4. Suicidal:															
Vulnus Sclopetarium	..	1	..	..	..	..	1	..	1	..	..	..	..	..	..
„ Incisum ..	..	..	..	..	..	2	1	..	..	..	..	2	1	..	..
6. Punitus	3	..	3	..	..	1	..	..	..	..	..	..	..	1	..
Total	616	6	288	208	106	1,214	11	850	5	64	1	195	5	96	..

APPENDIX No. XVI.

Abstract, showing the Admissions into Hospital and Deaths among the Black Troops serving in the Windward and Leeward Command, Jamaica, Honduras, and Bahamas, in the Year 1863.

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.								Honduras.		Bahamas.	
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.					
Average Strength.	477		970		585		15		98		266		322		414	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*																
1. Miasmatic:																
Variola	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Varicella	..	..	3	..	3	..	..	..	..	..	..	..	..	..	..	..
Tonsillitis	46	..	6	..	5	..	..	..	1	..	..	..	2	..	6	..
Influenza	8	..	3	..	2	..	1	..	..	..	..	..	..	..	..	..
Ophthalmia.. ..	10	..	13	..	11	..	..	..	2	..	..	..	5	..	10	..
Furunculus.. ..	1	..	3	..	3	..	..	..	..	..	..	..	..	..	1	..
Anthrax	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Dysenteria Acuta .	2	..	7	..	5	..	..	..	..	..	2	..	..	..	1	..
„ Chron:	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Diarrhœa	6	..	11	..	10	..	..	..	1	..	..	..	2	..	2	..
Cholera	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Febris Intermittens	26	..	35	1	12	..	1	..	9	..	13	1	26	..	26	..
„ Remittens .	82	2	17	1	17	1	..	..	..	..	..	..	..	..	3	..
„ Continua ..	2	..	4	..	..	..	..	..	4	..	..	..	64	..	4	..
Rheumat: Acutus.	7	..	18	..	12	..	..	..	1	..	5	..	3	..	9	..
„ Chron:	31	..	52	..	33	..	..	..	2	..	17	..	9	..	10	..
2. Enthetic:																
Syphilis Primaria.	142	..	94	..	75	..	..	..	6	..	13	..	17	..	17	..
„ Secundaria	5	..	10	..	5	..	..	..	..	..	5	..	1	..	5	..
Iritis Syphilitica	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Bubo	12	..	35	..	31	..	..	..	1	..	3	..	3	..	6	..
Gonorrhœa	59	..	119	..	105	..	..	..	6	..	8	..	12	..	23	..
Phymosis, &c. ..	1	..	6	..	6	..	..	..	..	..	..	..	..	..	..	..
Orchitis (Gon.) ..	3	..	5	..	4	..	..	..	1	..	..	..	2	..	..	..
Strictura Urethræ	..	..	1	..	..	..	..	..	1	..	..	..	..	..	2	..
3. Dietic:																
Ebriositas	2	..	..	..	..	..	..	..	..	..	..	..	1	..	2	..
4. Parasitic:																
Porrigo	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Scabies	6	..	15	..	14	..	..	..	..	..	1	..	..	..	3	..
Tænia Solium ..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..
II. *Constitutional Diseases.*																
1. Diathetic:																
Lumbago	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Anasarca	2	..	2	..	2	..	..	..	..	..	..	..	..	..	1	..
Tumores	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..
Carcinoma	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
2. Tubercular:																
Scrofula	6	..	2	..	1	..	..	..	1	..	..	..	..	..	2	..
Phthisis Pulmon:	4	3	11	5	10	5	..	..	..	..	1	..	3	2	2	2
Hæmoptysis ..	..	..	1	1	1	..	..	1	..	..	..	..	..	..	1	1
Abscessus Psoanus	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1

Appendix No. XVI.—*continued.*

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.								Honduras.		Bahamas.	
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.					
Average Strength.	477		970		585		15		98		266		322		414	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
III. *Local Diseases.*																
1. Nervous:																
Apoplexia	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..
Paralysis	..	..	2	..	1	..	..	..	1	..	..	..	..	..	..	..
Mania	1	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..
Amentia	3	..	3	..	3	..	..	..	..	..	..	..	..	..	..	..
Epilepsia	5	..	4	..	3	..	..	..	..	..	1	..	..	..	1	..
Cephalæa	2	..	3	..	3	..	..	..	..	..	..	..	2	..	..	..
Otitis	..	..	3	..	3	..	..	..	..	..	..	..	..	..	..	..
2. Circulatory:																
Morb: Valv: Cord:	..	1	..	..	..	..	..	..	..	..	..	..	1	1	..	..
Aneurisma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
Varix	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Angina Pectoris..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Syncope	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
3. Respiratory:																
Bronchitis Acuta	36	..	28	2	25	1	..	..	..	..	3	1	2	..	13	..
„ Chron:	6	2	5	..	2	..	..	..	..	..	3	..	2	1	2	..
Pleuritis	8	..	9	..	8	..	..	..	1	..	..	..	..	..	4	..
Pneumonia.. ..	8	2	6	2	5	2	..	..	..	..	1	..	1	..	2	..
Epistaxis	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hydrothorax ..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4. Digestive:																
Glossitis	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Stomatitis	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Gastritis	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Obstipatio	5	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..
Dyspepsia	8	..	3	..	2	..	..	..	..	..	1	..	2	..	1	..
Colica	1	..	10	..	9	..	..	..	..	..	1	..	..	..	3	..
Hernia..	1	..	3	..	1	..	..	..	..	..	2	..	1	..	1	..
Hæmorrhois ..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	2	..
Hepatitis Acuta ..	1	1	1	..	1	..	..	..	..	..	..	..	..	..	..	..
„ Chronica	..	..	1	1	1	..	..	1	..	..	..	..	3	..	..	..
Icterus..	1	..	5	1	..	..	..	..	1	..	4	1	..	..	..	..
Ascites..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	1
Melæna	..	..	1	1	1	1	..	..	..	..	..	..	..	..	..	..
5. Urinary:																
Ischuria	..	..	1	..	1	..	..	..	..	..	..	..	..	..	3	..
Hæmatura	..	..	2	..	2	..	..	..	..	..	..	..	..	..	1	..
Cystitis	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
6. Reproductive:																
Varicocele	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hydrocele	..	..	3	..	2	..	..	..	..	..	1	..	..	..	..	..
Orchitis (not Gon:)	8	..	12	..	8	..	..	..	2	..	2	..	2	..	2	..
Sarcocele	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
7. Locomotive:																
Arthritis	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Synovitis	2	..	2	..	1	..	..	..	1	..	..	..	..	..	..	..

Appendix No. XVI.—*continued.*

Stations	Jamaica.		Windward and Leeward Command.		Subordinate Stations.								Honduras.		Bahamas.	
					Barbadoes.		St. Lucia.		Trinidad.		British Guiana.					
Average Strength.	477		970		585		15		98		266		322		414	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Hydrarthrus ..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Periostitis	2	..	1	..	1	..	..	..	..	..	..	..	..	..	3	..
Necrosis	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
8. Integumentary:																
Urticaria	..	..	2	..	2	..	..	..	..	..	..	..	..	..	1	..
Eczema	2	..	5	..	4	..	..	..	1	..	..	..	3	..	2	..
Herpes..	1	..	2	..	2	..	..	..	..	..	..	..	..	..	2	..
Psoriasis	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Ecthyma	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Pemphigus.. ..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..
Frambœsia.. ..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..
Phlegmon	9	..	24	..	14	..	..	..	3	..	7	..	14	..	8	..
Abscessus	24	..	14	..	18	..	..	..	..	..	1	..	5	..	6	..
Paronychia.. ..	2	..	2	..	1	..	..	..	1	..	..	..	..	..	4	..
Ulcus	15	..	77	..	65	..	1	..	4	..	7	..	2	..	6	..
V. *Violent Deaths or Diseases.*																
1. Accidental:																
Ambustio	1	..	1	..	..	..	..	..	..	..	1	..	..	..	1	..
Fractura	..	..	4	..	4	..	..	..	..	..	..	..	1	..	1	..
Ruptura Splenis..	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Contusio	8	..	13	..	9	..	..	..	1	..	3	..	7	..	8	..
Vulnus Sclop. ..	..	..	12	..	6	..	..	..	..	..	6	..	..	..	1	..
„ Incisum..	11	..	19	..	12	..	..	..	1	..	6	..	17	..	9	..
Luxatura	..	..	2	..	1	..	..	..	1	..	..	..	..	..	..	..
Subluxatio	8	..	3	..	..	..	..	..	1	..	2	..	..	..	2	..
Vesiculæ Pedis ..	22	..	6	..	4	..	..	..	..	..	2	..	..	..	3	..
4. Suicidal.																
Vulnus Sclop: ..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vulnus Incisum..	..	..	1	1	..	..	..	..	..	1	..	..	..	..	..	..
5. Executio ..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..
6. Punitus ..	..	..	2	..	2	..	..	..	..	..	..	..	..	..	4	..
No appreciable Disease ..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..
Total	682	13	786	16	600	10	3	2	57	1	126	3	218	6	240	6

APPENDIX No. XVII.

Abstract, showing the Number of Men sent Home from the West Indies in 1863, recommended to be Discharged as Invalids, or for change of Climate; also the number finally discharged the Service at the Invalid Depôt during the year, and the number of Black Troops discharged as Invalids in the West Indies and Western Africa.

Diseases.	White Troops.						Black Troops.
	Sent home from				Discharged the Service at the Invalid Depôt in England from—		Discharged as Invalids, in the West Indies and Western Africa.
	Windward and Leeward Command.		Jamaica.				
	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.	Windward and Leeward Command.	Jamaica.	
I. *Zymotic Diseases.*							
1. Miasmatic:							
Ophthalmia	8	10	..	2	10	2	1
Dysenteria Chronica ..	..	..	..	1	..	..	1
Diarrhœa..	..	..	1	2	..	1	..
Febris Intermittens ..	..	..	..	..	..	..	1
„ Remittens ..	..	..	..	..	1	..	1
Rheumatismus Chronicus	..	1	..	1	1	1	9
2. Enthetic:							
Syphilis Primaria ..	..	..	..	..	..	..	1
„ Secundaria ..	..	..	..	..	..	1	..
Iritis Syphilitica.. ..	..	..	..	..	..	1	1
4. Parasitic:							
Porrigo	..	1	..	..	..	..	..
II. *Constitutional Diseases.*							
1. Diathetic:							
Ischias	..	..	..	..	..	..	1
Anæmia	..	1	..	..	1	..	..
Anasarca..	..	..	..	..	..	..	1
2. Tubercular:							
Scrofula	..	..	..	..	..	..	8
Phthisis Pulmonalis ..	..	6	1	1	4	2	..
III. *Local Diseases.*							
1. Nervous:							
Delirium Tremens ..	..	1	..	..	..	..	..
Amentia	1	1	1	..	..	..	4
Epilepsia..	..	..	1	..	..	..	1
Cephalæa..	..	1	..	..	..	..	..
Otitis	..	1	..	..	..	..	..
2. Circulatory:							
Morbus Valv: Cordis ..	..	1	..	..	1	..	..
Aneurisma	..	..	..	..	..	..	1
Varix	..	..	..	..	1	..	..

Appendix No. XVII—*continued.*

Diseases.	White Troops.						Black Troops.
	Sent Home from				Discharged the Service at the Invalid Depôt, from—		Discharged as Invalids, in the West Indies and Western Africa.
	Windward and Leeward Command.		Jamaica.				
	For Discharge.	For Change of Climate.	For Discharge.	For Change of Climate.	Windward and Leeward Command.	Jamaica.	
3. Respiratory:							
Bronchitis Chronica ..	..	2	1	2	2	2	1
Pneumonia	..	..	1	..	..	..	..
4. Digestive:							
Dyspepsia	..	1	..	..	..	..	..
Hepatitis Acuta	..	..	1	..	..	..	..
„ **Chronica** ..	..	..	..	..	..	1	..
6. Reproductive:							
Varicocele	1	..	..	..	..	..	..
Hydrocele	..	1	..	..	..	..	..
Orchitis (not Gonorrhœal)	..	2	..	..	2	..	..
7. Locomotive:							
Synovitis	..	..	..	..	..	..	1
Contractura	..	..	..	..	..	1	..
Periostitis	..	..	..	..	..	..	1
8. Integumentary:							
Eczema	..	3	..	..	..	..	..
Abscessus	..	..	1	..	..	1	1
Ulcus	..	..	..	..	1	..	2
V. ***Violent Deaths or Diseases.***							
1. Accidental:							
Fractura	1	..	..	..	..	..	..
Amputatio	1	..	..	..	1	1	..
Vulnus Incisum	..	..	1	..	..	..	..
Subluxatio	1	..	..	..	..	..	..
Total	8	33	9	9	25	14	32

APPENDIX No. XVIII.

ABSTRACT, showing the Ages of the Troops serving in the West Indies and the Deaths at each Age during the Year 1868.

Age	Under 20.		20-24.		25-29.		30-34.		35-39.		40 and upwards.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
WHITE TROOPS.														
Royal Artillery	11	..	97	1	75	2	25	1	9	..	..	..	217	4
1st Battalion 14th Regiment ..	28	..	240	1	337	5	101	1	21	..	3	1	730	8
" 21st "	8	..	199	..	416	3	120	..	52	..	5	..	800	3
Total	47	..	536	2	828	10	246	2	82	..	8	1	1,747	15
BLACK TROOPS.														
Windward and Leeward Command.	55	1	188	3	323	6	184	2	185	2	42	2	977	16
Jamaica	244	4	496	7	180	2	54	..	21	..	7	..	1,002	13
Honduras	89	1	39	2	85	2	53	..	38	..	7	..	312	5
Total	388	6	723	12	588	10	291	2	244	2	56	2	2,291	34

APPENDIX No. XIX.

ABSTRACT, showing the Admissions into Hospital and Deaths among the Black Troops serving in Western Africa, during the Year 1863.

Stations	Sierra Leone.		Gambia.		Lagos.		Gold Coast.	
Strength	430		249		98		546	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*								
1. Miasmatic:								
Variola	1	..	6	..	3	..	..	..
Varicella	..	..	1	..	..	..	..	..
Tonsillitis	4	..	2	..	1	..	5	..
Influenza	1	..	..	..	..	..	2	..
Ophthalmia	11	..	8	..	..	..	10	..
Erysipelas	2	..	..	..	..	..	1	..
Furunculus	3	..	..	..	3	..	1	..
Anthrax	1	..	..	..	..	..	1	1
Dysenteria Acuta	7	3	30	1	9	7	125	20
„ Chronica	1	..	1	..	..	..	..	..
Diarrhœa	9	..	35	..	19	..	46	..
Febris Intermittens	30	..	85	1	88	..	28	..
„ Remittens	67	..	44	..	13	1	78	1
„ Continua	..	..	..	..	1	..	..	..
Rheumatismus Acutus	12	..	10	..	3	..	20	..
„ Chronicus	14	..	5	..	13	..	16	..
2. Enthetic:								
Syphilis Primaria	24	..	18	1	35	..	12	..
„ Secundaria	7	..	1	..	4	..	2	..
Iritis Syphilitica	1	..	..	..	..	..	1	..
Bubo	13	..	4	..	14	..	10	..
Gonorrhœa	49	..	36	..	30	..	37	..
Phymosis, &c.	..	..	..	..	..	..	3	..
Orchitis (Gonorrhœal)	3	..	..	..	3	..	6	..
Strictura Urethræ	..	..	1	..	..	..	2	..
Ulcus Penis	..	..	1	..	..	..	..	..
3. Dietic:								
Scorbutus	2	..	..	..	..	..	..	..
Ebriositas	..	..	..	..	..	..	1	..
4. Parasitic:								
Scabies	27	..	..	..	..	..	..	..
Tænia Solium	..	..	2	..	..	..	..	..
Dracunculus	5	..	..	..	..	..	7	..
II. *Constitutional Diseases.*								
1. Diathetic:								
Lumbago	..	..	6	..	1	..	1	..
Anasarca	1	..	..	..	..	..	..	..
Podagra	1	..	..	..	..	..	..	..
2. Tubercular:								
Scrofula	..	..	..	..	..	..	1	..
Phthisis Pulmonalis	6	4	..	..	2	..	..	1
Hæmoptysis	2	..	..	..	..	..	..	..
Morbus Coxarius	..	..	2	..	..	..	..	..

Appendix No. XIX.—*continued.*

Stations	Sierra Leone.		Gambia.		Lagos.		Gold Coast.	
Strength	430		249		98		546	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
III. *Local Diseases.*								
1. Nervous:								
Apoplexia	1	..	..	..	1	1	..	..
Lethargus	1	..	..	..	..	..	..	..
Paralysis	..	..	..	..	1	..	..	..
Delirium Tremens	1	..	..	..	..	..	1	1
Mania	1	..	..	..	1	..	..	..
Amentia	1	..	..	..	..	..	..	..
Epilepsia	..	..	..	..	1	..	6	..
Cephalæa	6	..	..	..	..	..	..	..
Neuralgia	..	..	1	..	..	..	3	..
Otitis..	1	..	..	..	..	..	2	..
Cataractes	..	..	1	..	..	..	..	..
2. Circulatory:								
Pericarditis	..	..	..	..	..	..	2	..
Palpitatio Cordis	..	..	1	..	..	..	..	..
3. Respiratory:								
Laryngitis	..	..	..	..	1	..	..	..
Bronchitis Acuta	10	..	13	1	1	..	10	..
„ Chronica.. ..	7	..	3	..	5	..	..	..
Pleuritis	4	..	2	..	1	..	2	..
Pneumonia	7	1	4	..	..	..	..	..
Congestio Pulmonalis ..	..	..	1	..	..	..	..	..
4. Digestive:								
Stomatitis	..	..	..	..	2	..	1	..
Gastritis	..	..	..	..	..	..	2	..
Enteritis	..	..	1	..	..	..	..	..
Peritonitis	2	1	1	1	..	..	..	..
Obstipatio	2	..	..	..	1	..	..	..
Dyspepsia	2	..	..	..	..	..	..	..
Colica	5	..	7	..	13	..	9	..
Ileus	..	..	..	..	1	..	..	..
Hernia	..	..	..	..	4	..	2	..
Hæmorrhois..	..	..	5	..	..	..	1	..
Splenitis	..	..	3	..	1	..	..	..
Hepatitis Acuta	..	..	5	1	1	..	..	..
„ Chronica	1	1	1	1	4	..	1	..
Icterus	..	..	1	..	..	..	..	..
Ascites	1	1	1	..	1	..	..	..
Melæna	..	..	..	..	1	..	..	..
5. Urinary:								
Nephritis	..	..	1	..	1	..	..	..
Ischuria	1	..	..	..	..	..	..	..
Hæmaturia	2	..	..	..	..	..	1	..
Cystitis	..	..	..	..	1	..	1	..
6. Reproductive:								
Hydrocele	..	..	1	..	4	..	..	..
Hæmatocele	1	..	..	..	..	..	..	..
Orchitis (not Gonorrhœal) ..	8	..	3	..	3	..	2	..

Appendix No. XIX.—*continued.*

Stations	Sierra Leone.		Gambia.		Lagos.		Gold Coast.	
Strength	430		249		98		546	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
7. Locomotive:								
Arthritis	2	..	1	..	..	..	1	..
Periostitis	..	..	3	..	1	..	..	..
Exostosis	4	..	..	..	..	..	..	..
Necrosis	1	..	..	..	..	..	..	..
8. Integumentary:								
Eczema	..	..	..	..	1	..	4	..
Herpes	3	..	..	..	..	..	2	..
Impetigo	1	..	..	..	..	..	..	..
Psoriasis	..	..	..	..	..	..	1	..
Lichen	..	..	1	..	..	..	..	..
Ecthyma	3	..	..	..	..	..	..	..
Framboesia	1	..	..	..	..	..	..	..
Phlegmon	7	..	5	..	..	..	14	..
Abscessus	12	..	7	..	3	..	18	..
Paronychia	..	..	1	..	1	..	..	..
Ulcus..	43	..	13	..	19	..	73	..
V. *Violent Deaths or Diseases.*								
1. Accidental:								
Ambustio	1	..	..	..	2	..	..	..
Insolatio	..	..	..	..	1	..	..	..
Fractura	..	..	1	..	..	..	..	..
Privatio	..	..	2	..	..	..	..	..
Contusio	8	..	10	..	4	..	10	..
Vulnus Sclopetarium ..	..	..	2	..	..	..	3	..
„ Incisum	3	..	8	..	1	..	9	..
Subluxatio	4	..	7	..	2	..	12	..
Vesiculæ Pedis	1	..	..	..	..	..	2	..
2. In Battle:								
Vulnus Sclopetarium ..	16	..	..	..	17	1	..	..
6. Punitus	5	..	..	..	3	..	4	..
Total	484	11	415	7	297	10	622	24

APPENDIX No. XX.

Abstract, showing the Admissions into Hospital and Deaths among the Troops serving at St. Helena, the Cape of Good Hope, Mauritius, and Ceylon, in the year 1863.

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon.			
							White.		Black.	
Strength	624		4,297		1,978		884		1,438	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*										
1. Miasmatic:										
Variola	..	..	..	..	..	..	1	..	12	1
Varioloides	..	..	..	..	..	..	..	..	11	..
Varicella	..	..	..	..	..	..	..	..	1	..
Morbilli	..	..	..	..	..	..	..	..	1	..
Scarlatina	..	..	..	..	..	..	3	1	..	..
Tonsillitis	8	..	66	..	9	..	12	..	5	..
Influenza	26	..	59	..	1	..	..	..	..	..
Ophthalmia	13	..	388	..	104	..	131	..	58	..
Erysipelas	1	..	9	..	1	..	1	..	2	..
Furunculus	35	..	28	..	11	..	4	..	12	..
Dysenteria Acuta	1	..	57	2	82	3	83	8	60	3
„ Chronica	1	..	21	2	14	1	4	..	1	1
Diarrhœa	45	1	115	1	72	1	132	1	53	2
Cholera Spasmodica	1	1	..	..	..	..	4	2	1	1
Febris Intermittens	2	..	8	..	5	..	76	..	473	1
„ Remittens	8	..	9	1	..	..	3	2	20	1
„ Typhoides	..	..	..	..	..	..	4	1	..	..
„ Typhus	1	..	..	..	..	..	..	..	..	..
„ Continua	25	..	150	7	89	2	79	2	4	..
Rheumatismus Acutus	1	..	67	..	17	..	51	..	64	..
„ Chronicus ..	23	..	68	..	22	..	20	..	5	..
Parotitis	..	..	..	..	..	..	..	..	2	..
Miliaria	..	..	1	..	..	..	..	..	..	..
2. Enthetic:										
Syphilis Primaria	14	..	441	..	106	..	93	..	15	..
„ Secundaria	4	..	100	..	19	..	28	..	9	..
Iritis Syphilitica	..	..	4	..	..	..	..	..	..	..
Bubo	3	..	122	..	45	..	50	..	6	..
Gonorrhœa	26	..	398	..	100	..	54	..	18	..
Phymosis, &c.	..	..	9	..	4	..	5	..	..	..
Orchitis (Gonorrhœal)	3	..	29	..	6	..	5	..	1	..
Strictura Urethræ	1	..	14	..	6	..	2	..	3	..
3. Dietic:										
Scorbutus	..	..	22	..	2	..	1	..	..	..
Purpura	..	..	1	..	3	..	..	..	..	..
Ebriositas	24	..	62	1	20	1	21	..	2	..
4. Parasitic:										
Porrigo	..	..	6	..	..	..	..	..	..	..
Scabies	1	..	10	..	3	..	2	..	96	..
Tænia Solium	..	..	1	..	1	..	..	..	..	..
Ascaris Lumbricoides	..	..	..	..	2	..	..	..	..	..
Vermes	1	..	3	..	..	..	..	..	..	..

Appendix No. XX.—*continued.*

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon.			
							White.		Black.	
Strength	624		4,297		1,978		884		1,438	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*										
1. Diathetic:										
Podagra..	..	..	1	..	..	..	..	..	1	..
Lumbago..	3	..	7	..	1	..	1	..	4	..
Anæmia	..	..	10	..	..	..	..	..	..	..
Anasarca	1	..	2	..	..	..	..	..	2	..
Tumores	..	..	2	..	1	..	..	..	..	..
Lupus	..	..	..	..	1	..	..	..	..	..
Carcinoma	..	..	..	..	..	..	..	..	1	..
2. Tubercular:										
Scrofula	..	..	9	..	4	..	4	..	..	..
Phthisis Pulmonalis	8	..	22	6	17	4	11	3	5	2
Hæmoptysis	4	..	7	2	3	..	1	..	..	..
III. *Local Diseases.*										
1. Nervous:										
Meningitis	..	..	1	1	..	..	..	..	..	..
Myelitis	..	..	..	..	1	1	..	..	..	..
Apoplexia	..	1	1	..	..	1	2	..	..	..
Paralysis	1	..	16	..	1	..	..	..	2	1
Delirium Tremens	4	..	16	1	9	..	5	1	..	..
Mania	1	..	2	..	1	..	..	..	2	..
Amentia	8	..	10	..	1	..	1	..	2	..
Tetanus	..	..	..	..	..	..	..	..	2	1
Epilepsia..	1	..	19	1	1	..	..	..	2	..
Cephalæa..	..	..	10	..	5	..	7	..	7	..
Neuralgia	..	..	7	..	1	..	..	..	4	..
Odontalgia	2	..	..	..	..	..	..	..	..	..
Dysecœa	..	..	4	..	2	..	1	..	..	..
Otitis	3	..	13	..	1	..	11	..	3	..
Cæcitas	..	..	..	..	1	..	..	..	..	..
2. Circulatory:										
Carditis	..	..	2	..	..	..	..	..	..	..
Pericarditis	..	..	2	1	3	..	3	..	..	..
Hypertrophia cordis	..	..	..	..	10	..	..	..	..	..
Atrophia cordis	..	..	1	..	..	..	..	..	..	..
Morbus Valv: Cordis	..	..	29	3	9	1	2	..	..	..
Morbus cordis	..	..	4	1	..	..	..	..	..	..
Palpitatio cordis..	..	..	2	..	1	..	..	..	..	..
Aneurisma Aortæ.	..	..	4	4	..	..	..	..	..	..
Aneurisma	..	..	1	..	..	..	..	..	..	..
Varix	3	..	1	..	2	..	..	..	..	..
Syncope	..	..	1	..	..	..	..	..	..	..
3. Respiratory:										
Laryngitis	..	..	1	..	..	..	..	..	1	..
Bronchitis Acuta	5	..	81	1	57	1	34	..	56	..
,, Chronica	16	..	23	..	8	..	22	..	10	..
Pleuritis	1	..	10	..	5	..	5	..	1	..
Pneumonia	..	..	7	3	1	1	2	..	8	3
Asthma	6	..	3	..	..	..	..	..	12	..
Epistaxis..	..	..	2	..	2	..	..	..	..	..
Emphysema	1	..	..	..	..	..	..	..	..	..

Appendix No. XX.—*continued.*

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon.			
							White.		Black.	
Strength	624		4,297		1,978		884		1,438	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
4. Digestive:										
Stomatitis	..	..	..	..	..	..	..	..	1	..
Pharyngitis	..	..	2	..	..	..	..	..	..	..
Gastritis	..	..	..	..	..	..	..	..	1	..
Enteritis	..	..	1	..	..	..	..	..	..	..
Peritonitis	..	..	3	1	..	..	..	..	1	..
Obstipatio	5	..	2	..	6	..	1	..	5	..
Dyspepsia	16	..	72	..	24	..	22	..	5	..
Colica	14	..	15	..	8	..	4	..	30	..
Hæmatemesis	..	..	1	..	..	..	..	..	..	..
Hernia	..	..	8	..	4	..	2	..	..	..
Hæmorrhois	3	..	33	..	18	..	7	..	1	..
Fistula in ano	..	..	1	..	1	..	..	..	..	..
Splenitis	..	..	..	..	..	..	1	..	1	1
Hepatitis Acuta	1	1	8	..	9	..	21	..	9	..
,, Chronica	1	..	5	..	10	..	18	..	6	1
Icterus	1	..	9	..	1	..	1	..	2	..
5. Urinary:										
Nephritis..	..	..	1	..	..	..	1	..	..	..
Nephria	1	..	..	..	1	..	..	..	..	..
Ischuria	..	..	2	..	..	..	1	..	..	..
Hæmaturia	1	..	..	..	..	..	..	..	..	..
Fistula in Perineo	..	..	3	..	..	..	..	..	..	..
Enuresis	..	..	2	..	4	..	8	..	..	..
Diuresis	..	..	..	..	..	..	1	..	..	..
6. Reproductive:										
Varicocele	..	..	2	..	1	..	..	..	..	..
Hydrocele	1	..	8	..	5	..	..	..	..	..
Orchitis (not Gonorrhœal) ..	1	..	37	..	28	..	24	..	22	..
7. Locomotive:										
Arthritis	..	..	18	..	4	..	1	..	..	..
Synovitis	..	..	4	..	5	..	1	..	..	..
Contractura	..	..	5	..	..	..	..	..	..	..
Periostitis	2	..	3	..	..	..	2	..	..	..
Exostosis..	..	..	1	..	..	..	..	..	..	..
Caries	..	..	1	..	1	..	..	..	..	..
Necrosis	..	..	2	..	..	..	..	..	..	..
8. Integumentary System:										
Urticaria..	..	..	..	..	..	..	..	..	3	..
Eczema	8	..	10	..	2	..	2	..	1	..
Herpes	2	..	4	..	2	..	..	..	3	..
Impetigo	1	..	9	..	2	..	..	..	..	..
Psoriasis	8	..	6	..	1	..	..	..	6	..
Lichen	1	..	..	..	..	..	..	..	..	..
Pemphigus	..	..	..	..	1	..	2	..	..	..
Ecthyma..	..	..	..	..	3	..	..	..	..	..
Rupia	..	..	..	..	1	..	..	..	..	..
Roseola	..	..	1	..	..	..	1	..	..	..
Acne	..	..	1	..	..	..	..	..	..	..
Phlegmon	4	..	145	..	46	..	40	..	38	..
Abscessus	3	..	14	..	30	1	24	..	42	..
Paronychia	1	..	53	..	6	..	5	..	4	..
Ulcus	7	..	176	..	44	..	76	..	71	..

Appendix No. XX.—*continued.*

Stations	St. Helena.		Cape of Good Hope.		Mauritius		Ceylon.			
							White.		Black.	
Strength	624		4,297		1,978		884		1,438	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
IV. *Developmental Diseases.*										
4. Diseases of Nutrition:										
Atrophia	..	..	3	..	11	..	1	..	2	..
V. *Violent Deaths or Diseases.*										
1. Accidental:										
Ambustio	2	..	7	..	4	..	1	..	1	..
Insolatio	..	..	..	..	1	..	2	..	..	..
Submersio	..	..	..	3	..	..	..	..	..	..
Fractura	1	..	24	..	5	..	5	..	1	..
Contusio	51	..	172	..	43	..	47	..	64	..
Commotio	..	..	3	1	1	1	..	..	2	..
Vulnus Sclopetarium	..	..	8	..	33	..	28	..	26	..
„ Incisum	25	..	71	1	1	..	..	..	3	..
Luxatura	..	..	8	..	..	..	2	..	6	..
Subluxatio	19	..	36	..	14	..	21	..	2	..
Vesiculæ Pedis	10	..	8	..	12	..	6	..	..	..
Morsus Serpentis	..	..	..	..	..	..	1	..	..	..
Venenatio	..	..	..	..	..	..	..	..	1	..
3. Homicidal:										
Suffocatio	..	..	..	1	..	..	..	..	..	..
4. Suicidal:										
Vulnus Incisum	..	..	..	..	1	1	..	..	..	..
„ Sclopetarium	..	..	..	1	..	1	..	1	..	..
Suspendium	..	..	..	..	..	1	..	..	..	..
6. Punitus	2	..	17	..	6	..	1	..	1	..
No appreciable disease	..	..	..	..	..	..	1	..	..	..
Diseases not specified	..	..	..	..	..	..	..	..	1	..
General Total	513	4	3616	46	1288	22	1358	22	1422	19

Causes of the Deaths of the Invalids.

	St. Helena.	Cape.	Mauritius.	Ceylon.
				White.
Diarrhœa	..	..	2	3
Phthisis	1	1	1	1
Abscessus Psoanus ..	..	..	1	..
Encephalitis	..	1	..	..
Total	1	2	4	4

APPENDIX No. XXI.

ABSTRACT, showing the Number of Men sent home from the Cape of Good Hope and Mauritius in 1863, recommended to be discharged as Invalids, or for Change of Climate, and of Invalids finally discharged the Service in these Colonies and in England.

Stations	Cape of Good Hope.				Mauritius.		Discharged in England.
	Sent Home for—		Discharged as Invalids—		Sent Home for—		
Diseases.	Discharge.	Change of Climate.	In the Colony.	In England.	Discharge.	Change of Climate.	
I. *Zymotic Diseases.*							
1. Miasmatic Diseases:							
Ophthalmia	5	11	..	19	..	..	..
Dysenteria Chronica	..	2	..	2	1	2	1
Diarrhœa	..	..	..	..	..	1	..
Febris Intermittens	..	..	..	..	..	1	..
Rheumatismus Acutus ..	..	..	..	1	..	..	..
" Chronicus ..	2	3	3	6	..	1	1
2. Enthetic Diseases:							
Syphilis Secundaria	..	1	..	5	..	..	1
Iritis Syphilitica	..	1	..	..	..	..	..
Strictura Urethræ	..	2	..	2	..	..	..
II. *Constitutional Diseases.*							
1. Diathetic Diseases:							
Anæmia	..	..	..	2	..	..	..
Tumores	..	..	..	..	1	..	1
2. Tubercular Diseases:							
Scrofula	1	1	..	3	..	..	1
Phthisis Pulmonalis	..	..	1	5	1	1	..
III. *Local Diseases.*							
1. Of the Nervous System:							
Paralysis	3	2	..	2	..	..	..
Mania	..	..	..	..	2	..	..
Amentia	4	..	..	..	1	..	..
Epilepsia	1	..	..	..	1	..	1
Cephalæa	..	1	..	1	..	..	..
Otitis	..	1	..	2	..	..	..
Cæcitas	..	..	..	..	1	..	..
2. Circulatory System:							
Hypertrophia Cordis	2	..	..	1	1	1	..
Morbus Valv: Cordis	..	11	1	12	..	..	2
Aneurisma	..	..	..	1	..	..	..
Varix	1	1	..	2	1	..	1
3. Respiratory System							
Laryngitis	..	1	..	..	..	..	..
Bronchitis Acuta	..	..	..	..	2	..	..
" Chronica	..	2	..	2	..	..	
Pleuritis	..	1	..	1	..	..	

APPENDIX No. XXI.—*continued.*

Stations	Cape of Good Hope.				Mauritius.		Discharged in England.
	Sent Home for—		Discharged as Invalids—		Sent Home for—		
Diseases.	Discharge.	Change of Climate.	In the Colony.	In England.	Discharge.	Change of Climate.	
4. Of the Digestive System:							
Peritonitis	..	1	..	..	..	..	..
Hernia	2	..	1	1	..	..	..
Hepatitis Chronica	..	..	..	2	2	2	2
Ascites	..	..	..	1	..	..	..
5. Of the Urinary System:							
Enuresis..	..	..	..	1	..	..	..
6. Of the Reproductive System:							
Orchitis (not Gonorrhœal) ..	..	..	1	..	1	..	1
7. Of the Locomotive System:							
Arthritis	1	..	..	1	2	..	2
Contractura	1	..	..	2	..	..	2
Periostitis	..	..	..	1	..	..	..
Caries	1	..	..	..	..	..	..
Necrosis..	..	..	..	1	..	..	..
8. Of the Integumentary System:							
Rupia	..	..	..	.	1	..	..
Phlegmon	..	1	..	..	..	..	..
Abscessus	..	..	..	..	1	1	..
Ulcus	1	..	..	1	..	..	..
IV. *Developmental Diseases.*							
4. Diseases of Nutrition:							
Atrophia	4	1	1	6	4	..	6
V. *Violent Deaths or Diseases.*							
1. Accidental:							
Fractura	..	..	..	1	1	..	..
Luxatura	..	..	..	1	..	..	..
Subluxatio	1	1	..	1	..	..	..
Worn out	1	..	..	..	3	..	..
Total	31	45	8	89	27	10	23

APPENDIX No. XXII.

Abstract, showing the Ages of the Troops serving at the Cape of Good Hope, and the Deaths at each Age, during the Year 1863.

	Under 20 Years.		20-24.		25-29.		30-34.		35-39.		40 and upwards.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Stngth.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	2	..	35	1	54	..	44	1	17	1	..	..	152	3
Royal Engineers ..	5	..	26	..	106	1	32	..	11	..	3	..	183	1
2nd Batt. 5th Foot*..	164	..	264	4	320	1	33	1	13	2	..	1	794	9
2nd „ 10th „ ..	28	..	548	4	162	2	77	1	15	..	6	..	836	7
2nd „ 11th „ ..	87	..	512	3	182	5	56	..	8	..	..	..	845	8
96th Foot†	61	..	326	1	273	5	106	4	16	1	..	..	782	11
Total	347	..	1,711	13	1,097	14	348	7	80	4	9	1	3,592	39

* At Mauritius for 5 months, included.

† At home and on board ship for 3 months, included.

APPENDIX No. XXIII.

ABSTRACT, showing the Admissions into Hospital and Deaths among the Troops serving in Australia, New Zealand, and China, during the year 1863.

Stations	Australia.		New Zealand.		South China.		Shanghai.		China.	
					White.		White.		Black.	
Strength	788		5,779		1,202		1,262		1,562	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*										
1. Miasmatic:										
Variola	..	..	..	..	..	..	5	..	1	..
Tonsillitis	9	..	51	..	24	..	10	..	2	..
Influenza	21	..	86	..	1	..	1	..	..	..
Ophthalmia.. ..	20	..	369	..	50	..	100	..	13	..
Erysipelas	2	..	12	..	1	..	..	..	..	..
Furunculus.. ..	7	..	63	..	6	..	..	..	8	..
Anthrax	2	..	..	..	..	..	1	..	..	..
Dysenteria Acuta ..	12	..	57	..	40	2	52	18	59	2
„ Chronica.	..	..	9	1	20	..	68	14	8	2
Diarrhœa	12	..	217	1	191	11	265	2	170	3
Cholera Biliosa ..	..	..	4	..	..	..	..	..	3	..
„ Spasmodica	..	..	..	..	10	8	54	32	56	10
Febris Intermittens	2	..	11	..	786	..	446	1	616	2
„ Remittens ..	3	..	4	..	21	3	107	..	4	1
„ Typhoides ..	1	1	2	1	..	..	1	1	2	2
„ Typhus ..	..	..	..	..	1	..	1	1	..	..
„ Continua ..	21	1	79	3	873	3	162	..	22	..
Rheumat: Acutus ..	16	..	70	..	21	..	32	..	42	..
„ Chronicus	9	..	66	..	21	1	31	..	112	..
Parotitis	..	..	1	1	3	..	1	..	..	..
2. Enthetic:										
Syphilis Primaria ..	12	..	11	..	76	..	76	..	40	..
„ Secundaria	2	..	12	..	28	..	15	..	18	..
Iritis Syphilitica ..	..	..	..	..	1	..	..	..	..	..
Bubo	6	..	6	..	36	..	46	..	23	..
Gonorrhœa	29	..	36	..	94	..	86	..	47	..
Phymosis, &c. ..	..	..	4	..	..	..	5	..	2	..
Orchitis (Gonorr:)..	1	..	5	..	36	..	49	..	12	..
Strictura Urethræ ..	1	..	20	..	5	..	1	..	..	..
Verrucæ	..	..	1	..	..	..	1	..	..	..
3. Dietic:										
Scorbutus	..	..	1	..	3	..	3	..	..	..
Purpura	1	..	..	..	..	..	..	..	..	..
Ebriositas	13	1	61	..	107	1	60	..	3	..
Bronchocele ..	..	..	1	..	..	..	..	..	..	..
4. Parasitic:										
Porrigo	2	..	9	..	..	..	..	..	..	..
Scabies	4	..	91	..	3	..	..	..	25	..
Tænia Solium ..	..	..	3	..	2	..	12	..	..	..
Vermes	1	..	..	..	4	..	..	..	..	..
Ascaris Lumbricoides	..	..	..	..	1	..	..	..	..	..
Dracunculus ..	..	..	..	..	..	..	..	..	12	..

Appendix No. XXIII.—*continued.*

Stations	Australia.		New Zealand.		South China.		Shanghai.		China.	
					White.		White.		Black.	
Strength	788		5,779		1,202		1,262		1,562	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*										
1. Diathetic:										
Podagra	1	..	..	..	..	..	..	..	..	..
Lumbago	2	..	19	..	3	..	4	..	12	..
Ischias	..	..	1	..	..	..	..	..	..	..
Anæmia	..	..	..	..	..	..	5	1	..	..
Anasarca	..	..	3	..	..	..	2	..	3	..
Tumores	..	..	..	..	..	..	1	..	..	..
Carcinoma	..	..	..	..	..	..	1	1	..	..
Lupus	..	..	..	..	..	..	2	..	..	..
Gangræna	..	..	1	..	..	..	..	..	..	..
Beri Beri	..	..	..	..	..	..	..	..	1	..
2. Tubercular:										
Scrofula	1	..	6	..	3	..	..	..	..	..
Phthisis Pulmonalis	6	4	24	7	10	3	2	1	2	2
Hæmoptysis ..	2	2	8	..	5	..	..	..	2	..
III. *Local Diseases.*										
1. Nervous Syst.:										
Encephalitis ..	..	..	..	..	..	..	..	..	1	..
Meningitis	..	..	..	..	..	..	..	..	1	..
Myelitis	..	..	1	1	..	..	..	..	..	..
Apoplexia	..	..	1	1	7	2	2	2	..	..
Paralysis	2	..	5	..	3	..	..	..	1	..
Delirium Tremens..	..	..	20	1	6	1	15	1	..	..
Mania	..	..	3	..	..	..	2	..	2	..
Amentia	4	..	6	1	2	..	..	..	1	..
Epilepsia	6	1	25	1	..	..	6	..	6	..
Chorea	..	..	1	..	..	..	..	..	..	..
Convulsio	..	..	..	1	1	..	..	..	..	..
Cephalæa	2	..	13	..	3	..	3	..	4	..
Neuralgia	5	..	8	..	1	..	66	..	11	..
Odontalgia	..	..	..	..	..	..	..	..	5	..
Dysecœa	1	..	2	..	1	..	..	..	1	..
Otitis	1	..	23	..	4	..	8	..	3	..
Cæcitas	..	..	1	..	2	..	..	..	2	..
Amaurosis	..	..	1	..	..	..	..	..	..	..
Strabismus	..	..	1	..	..	..	..	..	..	..
Pterygium	..	..	1	..	..	..	..	..	..	..
Iritis	..	..	2	..	..	..	1	..	..	..
Nyctalopia	..	..	..	..	..	..	..	..	1	..
2. Circulatory Syst.:										
Carditis	..	..	..	..	..	..	1	1	..	..
Endocarditis ..	..	..	..	..	1	..	1	..	..	..
Pericarditis.. ..	1	..	..	..	..	..	..	..	..	..
Hypertrophia cordis	4	1	7	1	1	..	2	1	..	..
Degeneratio "	..	..	..	..	1	1	..	..	..	..

Appendix No. XXIII.—*continued.*

Stations	Australia.		New Zealand.		South China.		Shanghai.		China.	
					White.		White.		Black.	
Strength	788		5,779		1,202		1,262		1,562	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Palpitatio cordis ..	..	..	5	..	..	..	7	..	..	..
Morbus Valv: „ ..	..	..	9	1	6	..	..	..	..	..
Syncope	..	..	1	..	..	..	..	..	..	..
Aneurisma Aortæ ..	1	1	2	3	..	..	..	..	..	..
Aneurisma	..	..	1	..	..	..	..	..	..	..
Varix	2	..	8	..	..	..	2	..	..	..
Ruptura Venæ Cavæ	..	..	..	1	..	..	..	..	..	..
3. Respiratory Syst.:										
Laryngitis	..	..	3	..	..	..	..	..	..	..
Bronchitis Acuta ..	39	1	153	1	49	..	38	1	138	2
„ Chronica	2	..	58	..	26	1	57	..	19	..
Pleuritis	6	..	15	2	3	..	6	..	4	..
Pneumonia	..	..	11	1	5	1	3	2	8	..
Apoplexia Pulm: ..	..	..	1	1	..	..	..	..	1	..
Pleurodynia ..	..	..	..	..	1	..	..	..	..	..
Asthma	..	..	3	..	1	..	..	..	13	..
Epistaxis	..	..	1	..	..	..	..	..	..	..
4. Digestive Syst.:										
Gastritis	..	..	1	..	4	..	1	..	..	..
Enteritis	..	..	..	..	2	..	..	..	..	..
Peritonitis	1	..	3	1	..	..	2	1	..	..
Obstipatio	5	..	7	..	..	..	5	..	1	..
Dyspepsia	20	..	49	..	20	..	56	..	24	1
Colica	4	..	20	..	23	..	33	..	30	1
Hæmatemesis ..	..	..	1	..	2	..	1	..	..	..
Hernia	8	..	5	..	4	..	..	..	..	..
Hæmorrhois ..	5	..	28	..	2	..	7	..	7	..
Fistula in ano ..	..	..	6	..	..	..	1	..	..	..
Prolapsus Ani ..	..	..	..	..	1	..	..	..	..	..
Splenitis	..	..	..	..	4	..	1	..	3	..
Hepatitis Acuta ..	1	..	9	1	43	1	30	..	5	..
„ Chronica	2	..	10	..	27	..	34	5	..	..
Icterus	1	..	4	..	5	1	2	..	2	..
Ascites	..	..	1	1	2	..	2	..	..	..
5. Urinary Syst.:										
Nephritis	1	..	..	..	1	..	2	..	2	..
Nephria	..	..	4	2	1	..	..	..	..	..
Ischuria	..	..	3	..	..	..	..	..	..	..
Dysuria	..	..	..	..	..	..	..	..	2	..
Hæmaturia	3	..	2	..	..	..	1	..	..	..
Lithiasis	..	..	2	..	..	..	..	..	..	..
Cystitis	..	..	3	..	..	..	..	..	..	..
Fistula in Perineo ..	..	..	1	..	..	..	..	..	..	..
Enuresis	1	..	1	..	1	..	..	..	..	..
6. Reproductive System:										
Hydrocele	1	..	4	..	11	..	2	..	..	..
Orchitis (not Gon:)..	3	..	42	..	16	..	4	..	..	..

Appendix No. XXIII.—*continued.*

Stations	Australia.		New Zealand.		South China.		Shanghai.		China.	
					White.		White.		Black.	
Strength	788		5,779		1,202		1,262		1,562	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
7. Locomotive System:										
Arthritis	..	..	3	..	..	..	4	..	1	..
Synovitis	1	..	4	..	3	..	3	..	..	..
Contractura.. ..	..	..	3	..	..	..	..	..	2	..
Periostitis	1	..	2	..	2	..	..	..	..	..
Caries	..	..	4	..	..	..	..	..	..	..
8. Integumentary System:										
Eczema	..	..	8	..	3	..	..	..	..	..
Herpes	..	..	6	..	5	..	14	..	3	..
Impetigo	..	..	12	..	..	..	..	..	..	..
Psoriasis	..	..	5	..	..	..	3	..	..	..
Lichen	..	..	4	..	..	..	..	..	..	..
Ephelis	1	..	..	..	..	..	..	..	..	..
Pityriasis	1	..	..	..	..	..	..	..	..	..
Pemphigus	..	..	1	..	..	..	..	..	1	..
Ecthyma	..	..	1	..	..	..	..	..	1	..
Mentagra	..	..	..	..	1	..	..	..	1	..
Sycosis Menti ..	..	..	1	..	..	..	..	..	..	..
Phlegmon	29	..	148	..	78	..	80	..	57	..
Abscessus	3	..	47	..	9	1	2	..	3	..
Paronychia	..	..	29	..	5	..	5	..	8	..
Ulcus	19	..	129	..	39	..	31	..	35	..
IV. *Developmental Diseases.*										
4. Diseases of Nutrition:										
Atrophia	..	..	3	..	69	2	..	..	35	3
Debilitas	..	..	..	..	..	..	2	..	..	..
V. *Violent Deaths or Diseases.*										
1. Accidental:										
Ambustio	7	..	23	..	2	..	5	..	8	..
Explosio	..	..	..	..	1	..	..	..	..	..
Insolatio	..	..	..	..	4	3	10	2	..	..
Submersio	..	1	..	12	..	1	..	2	..	..
Fractura	2	..	25	3	9	..	2	..	2	..
Contusio	35	..	209	..	67	..	29	..	33	..
Commotio	..	..	2	..	..	..	..	..	1	..
Vulnus Sclopetarium	..	..	4	1	2	..	2	..	1	..
„ Incisum ..	16	..	89	..	34	..	11	..	21	..
Luxatura	1	..	9	..	1	..	1	..	1	..
Subluxatio	12	..	139	..	24	..	18	..	9	..
Vesiculæ Pedis ..	8	..	25	..	..	..	..	..	..	..
Venenatio	..	..	1	..	..	..	..	..	..	..
Morsus Serpentis ..	..	..	..	..	..	..	1	1	..	..

Appendix No. XXIII.—*continued.*

Stations	Australia.		New Zealand.		South China.		Shanghai.		China.	
					White.		White.		Black.	
Strength	788		5,779		1,202		1,262		1,562	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. In Battle:										
Prœlio Occisi ..	..	..	..	62	..	..	..	..	..	..
Amputatio	..	..	1	..	..	..	..	..	..	..
Resectio	..	..	6	..	..	..	..	..	..	..
Vulnus Incisum ..	..	..	2	..	..	..	..	..	..	..
„ Sclopetarium	..	..	118	10	..	..	..	..	..	..
3. Homicidal:										
Vulnus Incisum ..	..	..	1	..	..	..	..	..	..	..
4. Suicidal: Vulnus Sclopetarium	..	..	..	..	..	..	..	2	..	..
6. Punitus ..	2	..	201	..	..	..	3	..	1	..
No appreciable disease ..	1	..	..	..	..	..	..	..	..	..
Total ..	487	14	3,287	124	2,637	47	2,333	88	1,842	31

Causes of the Deaths of the Invalids.

	Australia.	New Zealand.	China. White.
Dysenteria	..	..	4
Diarrhœa..	..	..	2
Phthisis Pulmonalis	2	3	2
Apoplexia	..	1	..
Bronchitis Chronica	..	..	1
Gastritis	..	..	1
Hepatitis Chronica	..	1	1
Atrophia..	..	..	2
Diseases not specified	..	1	..
Total	2	6	13

APPENDIX No. XXIV.

Abstract, showing the Number of Men sent home from Australia and New Zealand, in 1863, recommended to be Discharged as Invalids, or for Change of Climate, and the Number discharged the Service as Invalids in Australasia and in England.

Stations	Australia.				New Zealand.			
	Sent Home.		Discharged the Service.		Sent Home.		Discharged the Service.	
Diseases.	For Discharge.	For Change of Climate.	In Colony.	In England.	For Discharge.	For Change of Climate.	In Colony.	In England.
I. *Zymotic Diseases.*								
1. Miasmatic:								
Ophthalmia	2	..	..	..	8	14	2	16
Diarrhœa	..	1	..	1	..	..	..	1
Febris Continua	..	..	..	..	..	..	..	1
Rheumatismus Chron:	4	1	3	3	4	1	3	6
2. Enthetic:								
Syphilis Secundaria	..	..	..	2	..	..	..	1
Strictura Urethræ	..	..	..	..	1	..	1	..
3. Dietic:								
Ebriositas	..	..	..	..	..	..	..	1
II. *Constitutional Diseases.*								
1. Diathetic:								
Anasarca	..	..	..	..	..	..	..	1
Gangræna	..	..	..	..	1	..	..	..
2. Tubercular:								
Scrofula	..	2	..	..	..	..	..	..
Phthisis Pulmonalis	..	3	..	3	9	7	..	9
III. *Local Diseases.*								
1. Nervous:								
Paralysis	..	..	..	..	..	..	..	1
Mania	1	..	..	..	2	1	..	..
Amentia	2	1	..	..	3	1	..	..
Epilepsia	..	..	1	..	5	1	2	4
Chorea	..	..	..	..	..	..	..	1
Cephalæa	..	..	..	..	..	..	..	1
Dysecœa	..	..	..	..	1	..	..	..
Otitis	..	..	..	..	..	1	..	2
Amaurosis	..	..	..	..	..	1	..	2
Cæcitas	..	..	..	..	..	..	..	..
Iritis	1	..	..	..	..	..	..	..
2. Circulatory:								
Hypertrophia Cordis	..	1	1	1	1	1	..	..
Morbus Valv: Cordis	..	..	..	..	1	..	..	5
Morbus Cordis	..	..	1	..	..	..	..	..
Palpitatio Cordis	..	..	1	..	1	1	..	..
Aneurisma	..	..	..	1	1	..	..	..
Varix	2	..	..	..	1	..	2	2
3. Respiratory:								
Bronchitis Chronica	..	..	2	1	4	2	1	5
Pleuritis	..	..	..	..	..	..	..	1
Asthma	..	..	1	..	..	..	..	..

APPENDIX No. XXIV.—*continued.*

Stations	Australia.				New Zealand.			
	Sent Home.		Discharged the Service.		Sent Home.		Discharged the Service.	
Diseases.	For Discharge.	For Change of Climate.	In Colony.	In England.	For Discharge.	For Change of Climate.	In Colony.	In England.
4. Digestive:								
Hernia	1	..	..	1	1	..	..	..
Hæmorrhois	..	..	..	..	..	1	..	..
Fistula in ano	..	..	..	..	..	..	1	..
Hepatitis Acuta	..	..	..	..	..	..	..	1
„ Chronica	..	..	..	..	..	2	..	2
Ascites	..	..	..	..	..	..	..	1
5. Urinary:								
Fistula in Perineo	..	..	..	..	..	1	..	..
Enuresis	..	..	..	..	..	1	..	..
6. Reproductive:								
Hydrocele	..	..	..	..	..	1	..	..
7. Locomotive:								
Arthritis	..	..	..	..	..	..	1	1
Contractura	1	..	3	1	..	..	..	1
Periostitis	..	..	..	..	..	..	1	..
Caries	..	..	..	..	..	1	..	..
Atrophia Musculorum	..	1	..	..	..	..	..	..
8. Integumentary:								
Psoriasis	..	..	1	..	..	..	..	..
Sycosis Menti	..	..	..	..	..	..	1	..
Abscessus	..	..	..	..	3	..	..	..
Ulcus	1	..	..	..	1	..	..	..
IV. *Developmental Diseases.*								
4. Diseases of Nutrition:								
Atrophia	..	..	3	2	..	1	..	2
V. *Violent Deaths or Diseases.*								
1. Accidental:								
Fractura	..	..	..	..	..	..	..	3
Amputatio..	..	..	..	..	..	..	1	..
Subluxatio..	..	..	..	..	..	1	..	..
2. In Battle:								
Vulnus Sclopetarium	..	..	..	..	1	5	2	1
Diseases not specified	1	2	..	..	..	..	..	..
Total	16	12	17	16	49	45	18	71

APPENDIX No. XXV.

Abstract, showing the number of Men sent Home as Invalids of the White Troops serving in Ceylon and China, and the Number finally discharged the Service in England; the Number of Men of the Black Troops discharged as Invalids in Ceylon; and the Number of Men of the Asiatic Force sent as Invalids from China to India.

Stations	Ceylon.				China.		
	White.			Black.	White.		Black.
	Sent Home for				Sent Home for		
Diseases.	Discharge from Service.	Change of Climate.	Discharged in England.	Discharged in the Colony.	Discharge from Service and Change of Climate.	Discharged in England.	Sent to India for Change of Climate.
I. *Zymotic Diseases.*							
1. Miasmatic:							
Ophthalmia	..	21	7	..	7	5	..
Dysenteria Chronica	..	..	..	..	19	5	..
Diarrhœa	..	1	..	..	14	4	..
Febris Intermittens	..	..	..	..	5	..	..
Rheumatismus Acutus	..	3	..	..	..	..	..
" Chronicus	..	3	1	2	2	2	6
2. Enthetic:							
Syphilis Secundaria	..	4	..	..	5	3	..
Bubo	..	2	..	..	..	..	..
Strictura Urethræ	..	..	..	..	2	..	..
II. *Constitutional Diseases.*							
1. Diathetic:							
Anæmia	..	..	1	..	1	1	..
Anarsarca	..	..	..	1	..	..	..
Beri Beri	..	..	..	..	..	..	1
Carcinoma	..	..	..	1	..	..	..
2. Tubercular:							
Scrofula	1	2	..	..	3	1	..
Phthisis Pulmonalis	..	5	6	1	3	1	1
Hæmoptysis	..	..	..	..	1	..	..
III. *Local Diseases.*							
1. Nervous:							
Meningitis	..	..	..	..	..	..	1
Paralysis	..	..	..	..	..	1	..
Mania	..	..	..	..	..	..	1
Amentia	..	1	1	2	3	..	1
Epilepsia	..	..	1	..	1	..	..
Cephalæa	..	1	..	..	..	..	..
Dysecœa	..	1	..	..	..	1	2
Otitis	..	..	..	..	..	..	..
Cæcitas	..	..	..	..	7	..	..
2. Circulatory:							
Pericarditis	..	..	1	..	..	..	..
Hypertrophia Cordis	..	..	3	..	1	1	..
Morbus Valv. Cordis	..	..	..	..	2	5	..
Aneurisma	..	..	..	..	..	1	..
3. Respiratory:							
Bronchitis Acuta	..	1	..	..	1	..	..
" Chronica	..	..	3	2	10	4	2

Appendix No. XXV.—*continued.*

Strength	Ceylon.				China.		
	White.			Black.	White.		Black.
Diseases.	Sent Home for		Discharged in England.	Discharged in the Colony.	Sent Home for	Discharged in England.	Sent to India for Change of Climate.
	Discharge from Service.	Change of Climate.			Discharge from Service and Change of Climate.		
4. Digestive:							
Gastritis	..	..	..	..	1	..	..
Dyspepsia	..	3	1	..	..	..	1
Splenitis	..	..	..	..	1	1	..
Hepatitis Chronica	..	9	3	..	13	1	..
5. Urinary:							
Nephritis..	..	..	..	..	1	..	..
Fistula in Pèrineo	..	..	..	..	..	1	..
6. Reproductive:							
Orchitis (not Gonorrhœal) ..	..	1	..	3	..	..	..
7. Locomotive:							
Contractura	..	..	1	..	..	1	2
Caries	..	..	1	..	..	..	..
8. Integumentary:							
Abscessus	..	..	..	..	..	..	
Ulcus	..	..	..	3	1	1	1
IV. *Developmental Diseases.*							..
4. Diseases of Nutrition:							
Atrophia..	..	6	..	..	24	2	12
Asthenia..	..	..	..	2	..	..	..
V. *Violent Deaths or Diseases..*							
1. Accidental:							
Fractura..	1	1	..	..	..	..	..
Vulnus Sclopetarium	..	..	1	..	..	..	..
Total	2	65	31	17	128	42	31

APPENDIX, No. XXVI.

Abstract showing the Ages of the Men serving in Australasia, and the Deaths in each Quinquennial Period of Life, during the Year 1863.

	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	4	..	184	..	205	..	57	2	15	2	14	2
Royal Engineers..	1	..	20	..	24	..	18	1	11	..	4	..
1st Bat. 12th Foot	130	..	252	9	210	3	65	..	57	3	19	..
2nd „ 14th „	38	..	227	12	401	3	441	..	214	..	..	..
40th Foot ..	9	..	202	7	225	4	122	4	53	4	22	..
57th „ ..	11	..	304	4	357	8	176	5	56	2	21	4
65th „ ..	2	..	168	5	373	7	235	7	221	9	26	1
70th „ ..	6	..	289	3	245	..	159	2	84	2	13	..
Total	196	..	1,596	40	2,040	25	1,268	21	711	22	119	7

APPENDIX, No. XXVII.

Abstract showing the Ages of the Men serving in China, and the Deaths in each Quinquennial Period of Life, during the Year 1863.

	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and upwards.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
Royal Artillery ..	2	..	61	3	152	16	39	2	2	2	..	..
67th Regiment ..	5	..	348	14	192	10	153	4	73	19	..	..
99th „ ..	8	..	391	9	362	14	81	2	28	4	4	1
Total	15	..	800	26	706	40	273	8	103	25	4	1

APPENDIX No. XXVIII.

Abstract, showing the Admissions into Hospital and Deaths among Her Majesty's European Troops serving in Bengal, Madras, and Bombay, during the year 1863.

Stations	Bengal.		Madras.		Bombay.	
Average Strength	42,575		12,621		12,329	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Variola	40	10	3	..	7	2
Varioloides	4	..	..	..	1	..
Varicella	2	..	1	..	..	..
Morbilli	5	..	2	..	2	..
Scarlatina	1	..	..	..	..	..
Tonsillitis	600	..	138	..	182	..
Influenza	291	..	24	..	57	..
Ophthalmia	2,019	..	305	..	646	..
Erysipelas	73	3	25	..	16	..
Furunculus	453	..	145	..	63	..
Anthrax	9	..	5	..	1	1
Dysenteria Acuta	1,663	39	599	18	375	19
„ Chronica	329	19	206	6		
Diarrhœa	3,891	47	903	6	785	7
Cholera	232	157	119	47	12	8
Febris Intermittens	23,741	55	1,877	2	6,015	6
„ Remittens	1,908	37	85	2	880	6
„ Typhoides	20	13	3	1	1	1
„ Typhus	12	5	2	..	3	..
„ Continua	4,097	29	537	15	525	4
Rheumatismus Acutus	1,954	2	406	..	869	..
„ Chronica	1,355	3	333	..		
Parotitis	16	..	8	..	3	..
Diphtheria	3	..	..	..	..	..
Pertussis	3	..	..	..	..	..
Coryza	..	..	8	..	12	..
2. Enthetic:						
Syphilis Primaria	3,993	..	1,119	..	1,122	1
„ Secundaria	1,221	9	519	4	265	..
Cachexia Syphiloidea	3	..	..	..	1	..
Iritis Syphilitica	34	..	13	..	10	..
Bubo	1,760	2	526	..	480	..
Gonorrhœa	3,905	..	886	..	1,118	..
Phymosis, &c.	48	..	9	..	10	..
Orchitis (Gonorrhœal)	314	..	58	..	80	..
Rheumatismus (Gonorrhœal)	..	..	7	..	..	..
Strictura Urethræ	129	1	43	..	35	..
Verrucæ	50	..	10	..	21	..
Ulcus Penis	159	..	10	..	93	..
3. Dietic:						
Scorbutus	27	..	5	..	76	..
Purpura	14	1	2	1	4	..
Ebriositas	392	15	238	..	280	3

Appendix No. XXVIII.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	42,575		12,621		12,329	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
4. Parasitic:						
Porrigo	10	..	3	..	7	..
Scabies	60	..	58	..	15	..
Tænia Solium	220	..	30	..	60	..
Phthiriasis	1	..	..	..	..	..
Pediculi	2	..	..	..	..	..
Vermes	46	..	2	..	4	..
Ascaris Lumbricoides	7	..	3	..	1	..
Aphthæ	1	..	..	..	..	..
Dracunculus	..	..	17	..	38	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Podagra	10	..	1	..	3	..
Lumbago	10	..	26	..	47	..
Ischias	..	..	..	..	1	..
Anæmia	130	3	22	..	65	1
Anasarca	29	4	12	1	12	2
Tumores	22	1	2	..	4	..
Lupus	5	..	..	..	1	..
Gangræna	1	..	..	..	..	..
Scirrhoma	1	..	..	..	..	..
Cachexia	..	..	..	..	1	..
Carcinoma	..	..	1	..	..	..
2. Tubercular:						
Scrofula	92	1	74	1	21	..
Phthisis Pulmonalis	314	88	131	17	59	13
Hæmoptysis	60	3	34	3	16	..
Abscessus Psoanus	3	..	..	1	..	..
Morbus Coxarius	3	1	..	..	1	..
III. *Local Diseases.*						
1. Nervous System:						
Encephalitis	4	1	2	2	..	..
Meningitis	8	7	1	1	..	..
Myelitis	1	..	1	1	1	..
Apoplexia	40	35	6	5	1	1
Paralysis	69	5	29	1	15	2
Abscessus Cerebri	..	1	..	..	..	..
Delirium Tremens	150	17	47	6	39	9
Mania	56	..	10	..	6	..
Amentia	78	2	24	..	34	..
Epilepsia	158	1	40	1	42	..
Cephalæa	266	1	131	1	118	..
Neuralgia	210	2	33	1	83	..
Dysecœa	40	..	14	..	10	..
Otitis	337	..	82	..	91	..
Amaurosis	3	..	3	..	4	..
Tinea Tarsi	1	..	..	..	..	..
Nyctalopia	2	..	..	..	..	..
Hemeralopia	..	..	1	..	1	..
Cæcitas	36	..	4	..	..	..
Vertigo	2	..	..	..	1	..
Convulsio	5	1	5	..	..	..
Tetanus	..	..	..	..	1	..
Chorea	2	..	..	..	..	..

Appendix No. XXVIII.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	42,575		12,621		12,329	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Hysteria	4	..	1	..	..	..
Hydrophobia	2	2	1	1	..	..
Odontalgia	5	..	8	..	4	..
Iritis	..	..	2	..	1	..
Cataractes	..	..	..	..	1	..
Entropium	..	..	..	..	1	..
Ozæna	..	..	2	..	..	..
Strabismus	..	..	1	..	..	..
Aphonia	..	..	2	..	..	..
Fistula Lachrymalis	..	..	4	..	..	..
2. Circulatory System:						
Carditis	15	2	24	..	49	2
Pericarditis	11	2	12	3	39	..
Hypertrophia Cordis	59	5	17	1	40	1
Atrophia „	7	..	1	..	..	..
Degeneratio „	1	..	..	..	..	..
Morbus Valv: „	143	10	50	4	21	..
Aneurisma Aortæ	5	5	3	1	3	..
Aneurisma	5	7	9	..	2	2
Varix	25	..	21	..	12	..
Palpitatio Cordis	53	..	9	..	17	..
Morbus „	6	2	..	..	..	..
Angina Pectoris	10	..	6	..	5	..
Syncope	4	..	2	..	4	1
Phlebitis	4	..	2	..	..	..
Arteritis	..	..	2	..	..	..
3. Respiratory System:						
Laryngitis	15	2	5	..	1	1
Œdema Glottidis	4	..	..	..	..	..
Bronchitis Acuta	1,380	8	469	3	467	5
„ Chronica	337	4	62	3		
Pleuritis	130	1	26	1	28	2
Hydrothorax	1	..	1	1	..	..
Pneumonia	107	18	16	1	32	3
Apoplexia Pulmonalis	1	..	..	..	1	1
Asthma	32	3	23	..	17	..
Emphysema	3	..	1	..	..	..
Epistaxis	16	..	2	..	1	..
Pleurodynia	25	..	5	..	1	..
4. Digestive System:						
Stomatitis	10	..	4	..	4	..
Pharyngitis	2	..	6	..	3	..
Œsophagitis	2	1	..	..	..	..
Glossitis	..	..	1	..	..	..
Gastritis	29	3	3	..	3	..
Enteritis	17	3	6	..	5	..
Peritonitis	10	3	8	4	4	1
Obstipatio	106	..	40	..	49	..
Dyspepsia	978	1	452	1	279	..
Colica	611	..	62	..	187	..
Ileus	1	..	..	..	..	..
Hæmatemesis	5	1	4	1	2	..
Hernia	52	..	12	..	14	1
Hæmorrhois	483	..	125	..	113	..
Fistula in Ano	51	..	11	..	9	..

Appendix No. XXVIII.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	42,575		12,621		11,829	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Prolapsus Ani	2	..	1	..	..	..
Splenitis	457	3	86	..	100	1
Hepatitis Acuta	1,468	83	529	25	544	33
" Chronica	1,246	51	298	18		
Icterus	220	5	46	..	58	2
Cirrhosis	1	1	..	..	..	..
Ascites	23	4	5	1	7	1
Strictura Recti	..	1	..	..	..	..
Melæna	..	..	8	..	1	..
5. Urinary System:						
Nephritis	37	8	10	1	11	..
Nephria	6	1	1	1	1	..
Ischuria	18	..	8	..	1	..
Hæmaturia	12	1	6	..	1	..
Lithiasis	2	..	8	..	1	..
Cystitis	14	..	4	..	4	..
Fistula in Perineo	..	..	1	..	1	..
Enuresis	19	..	8	..	4	..
Diabetes	8	..	8	..	2	..
6. Reproductive System:						
Varicocele	8	..	8	..	4	..
Hydrocele	29	..	34	..	10	..
Orchitis (not Gonorrhœal) ..	773	..	200	..	157	..
Sarcocele..	2	..	1	..	..	..
Spermatorrhœa	2	..	..	..	..	..
Polypus	1	..	..	..	..	..
7. Locomotive System:						
Arthritis	46	..	18	..	12	..
Synovitis..	83	1	10	..	19	..
Hydrarthrus	1	..	2	..	..	..
Contractura	5	..	4	..	3	..
Periostitis	107	1	15	..	40	..
Exostosis..	1	..	1	..	..	..
Caries	7	..	2	..	..	..
Necrosis	21	..	7	..	3	..
Atrophia Musculorum	..	..	9	..	..	..
8. Integumentary System:						
Urticaria	23	..	2	..	11	..
Eczema	89	..	18	..	30	..
Herpes	182	..	28	..	32	..
Impetigo	10	..	19	..	..	..
Psoriasis	47	..	22	..	21	..
Lichen	24	..	2	..	2	..
Pemphigus	4	..	8	..	..	..
Rupia	8	..	1	..	..	..
Ecthyma	7	..	2	..	8	..
Acne	4	..	3	..	2	..
Prurigo	6	..	3	..	3	..
Pityriasis..	2	..	2	..	..	..
Lepria	10	..	2	..	4	..
Roseola	8	..	..	..	1	..
Pompholyx	4	..	..	..	..	..
Mentagra..	..	..	3	..	1	..
Hordeolum	..	..	1	..	..	..

Appendix No. XXVIII.—*continued.*

Stations	Bengal.		Madras.		Bombay.	
Average Strength	42,575		12,621		12,329	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Phlegmon	1,542	..	660	..	638	..
Abscessus	337	2	147	1	45	..
Paronychia	177	..	41	..	52	..
Ulcus	1,445	..	548	..	370	..
IV. *Developmental Diseases.*						
Atrophia	296	6	77	2	50	2
Dentitio	1	..	..	..	..	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	60	..	18	..	11	..
Explosio	23	2	8	..	2	1
Gelatio	1	..	..	..	..	..
Insolatio	86	16	21	8	21	6
Submersio	1	19	3	16	..	3
Asphyxia	1	1	..	1	..	..
Fractura	143	5	72	2	56	1
Amputatio	5	..	2	1	4	1
Privatio	1	..	..	..	..	..
Ictus Fulminis	4	..	..	..	..	..
„ Apis	1	..	..	..	..	..
Ruptura Vesicæ	..	..	..	..	1	1
Contusio	2,112	8	739	..	732	..
Commotio	10	4	3	1	2	..
Vulnus Sclopetarium	30	1	5	..	7	..
„ Incisum	353	..	139	..	98	..
Luxatura	31	..	18	..	10	..
Subluxatio	642	..	291	..	196	..
Vesiculæ Pedis	181	..	77	..	23	..
Venenatio	3	1	4	..	..	..
Morsus Serpentis	4	1	1	..	..	..
„ Canis	10	..	1	..	5	..
„ Equi	3	..	..	..	..	..
„ Felis	..	..	1	..	..	..
2. In Battle:						
Prœlio Occisi	..	35	..	..	..	..
Vulnus Sclopetarium	150	6	..	..	..	..
„ Incisum	21	1	..	..	..	..
3. Homicidal:						
~~Contusio~~ (from a ~~blow~~)	..	..	..	..	..	1
4. Suicidal:						
Vulnus Sclopetarium	..	7	..	4	..	2
„ Incisum	..	1	..	..	2	1
Submersio	..	3	..	..	..	..
Suspendium	..	3	..	..	..	..
Venenatio	..	1	..	..	..	..
Fractura	..	..	..	..	1	1
Suicidium	..	2	..	..	..	..
6. Punitus	49	..	30	..	15	..
Diseases not specified	153	5	4	..	..	..
Total	74,910	1,034	15,835	246	19,612	163

Appendix No. XXVIII.—*continued.*

Causes of the Deaths of the Invalids.

	Bengal.	Madras.	Bombay.
I.—1. Dysenteria	19	12	6
Diarrhœa	4	3	1
Cholera..	1	..	..
Febris Intermittens ..	3	..	..
Rheumatismus.. ..	1	..	..
2. Syphilis Secundaria ..	..	1	1
II.—1. Anasarca	..	1	..
2. Phthisis Pulmonalis ..	22	7	8
Hæmoptysis	..	..	1
III.—1. Paralysis	2	..	..
Tetanus..	1	..	..
Apoplexia	1	..	..
Epilepsia	..	..	1
2. Carditis..	..	..	1
Morbus Valv : Cordis ..	5	2	1
Hypertrophia „ ..	1	1	..
Aneurisma	1	..	..
Morbus Cordis.. ..	2	1	1
3. Laryngitis	1	..	..
Bronchitis	1	2	1
Pneumonia	2	..	1
4. Gastritis	..	1	1
Hepatitis	8	1	8
Splenitis	1	..	..
Ascites	..	1	..
5. Nephria	3	..	..
Cystitis..	1	..	1
7. Necrosis	1	..	..
8. Abscessus	..	..	1
IV.—4. Atrophia	1	1	2
V.—1. Submersio	1	..	..
Not known	1	..	..
Total	84	34	36

APPENDIX No. XXIX.

Abstract showing the Number of Men sent Home as Invalids from Bengal, Madras, and Bombay, during the Year 1863. Also the Number finally Discharged the Service at the Invalid Depôt in England during the Year.

Stations..	Bengal.		Madras.			Bombay.		
Strength	42,575		12,621			12,329		
Diseases.	Men sent Home as Invalids during the Year.	Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.
			Discharge.	Change of Climate.		Discharge.	Change of Climate.	
I. *Zymotic Diseases.*								
1. Miasmatic Diseases:								
Tonsillitis	1	..	..	..	..	..	1	..
Ophthalmia	71	36	1	16	8	2	20	19
Erysipelas	1	..	..	..	..	..	..	..
Dysenteria Acuta ..	11	..	..	2	..	3	7	22
„ Chronica ..	37	23	4	31	10			
Diarrhœa	21	9	1	14	4	..	9	5
Febris Intermittens ..	76	32	1	4	1	2	2	16
„ Remittens ..	1	1	..	1	1	..	..	3
„ Continua ..	4	1	1	1	..	..	..	1
Rheumatismus	234	106	19	35	11	20	36	57
2. Enthetic Diseases:								
Syphilis Primaria ..	1	..	..	1	..	..	..	..
„ Secundaria ..	84	68	6	49	23	9	17	26
Iritis Syphilitica ..	3	1	..	..	2	..	1	1
Bubo	2	..	..	..	..	..	..	..
Gonorrhœa	1	..	..	..	..	..	..	..
Strictura Urethræ ..	4	4	..	2	..	1	2	3
3. Dietic Diseases:								
Scorbutus	1	..	1	..	..	..	..	..
4. Parasitic Diseases:								
Porrigo	..	..	..	1	..	..	..	..
II. *Constitutional Diseases.*								
1. Diathetic Diseases:								
Lumbago	..	..	1	..	..	..	..	..
Anæmia	22	22	..	2	8	1	9	3
Anasarca	1	..	..	1	..	..	..	..
Tumores	..	1	..	..	1	..	1	1
Podagra	..	..	1	..	..	..	..	..
Cachexia	..	..	1	1	..	2	12	..
2. Tubercular Diseases:								
Scrofula	11	20	10	16	6	3	1	8
Phthisis Pulmonalis ..	76	57	5	29	18	14	3	24
Hæmoptysis	1	1	..	..	..	..	..	4
Abscessus Psoanus ..	1	..	..	..	..	..	..	..
Morbus Coxarius ..	1	..	..	..	..	1	..	..

Appendix No. XXIX.—*continued.*

Stations..	Bengal.		Madras.			Bombay.		
Strength	42,575		12,621			12,329		
Diseases.	Men sent Home as Invalids during the Year.	Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.
			Discharge.	Change of Climate.		Discharge.	Change of Climate.	
III. *Local Diseases.*								
1. Nervous System:								
Meningitis	..	..	..	1	..	..	..	..
Myelitis	..	..	..	..	..	1	..	..
Apoplexia	1	..	..	..	..	..	..	..
Paralysis	16	14	3	3	3	3	2	12
Mania	12	2	..	1	..	4	..	..
Amentia	18	8	8	5	6	14	..	..
Epilepsia	30	16	5	4	3	14	..	7
Cephalæa	8	10	..	5	1	2	3	2
Neuralgia	3	2	..	..	..	..	1	1
Dysecœa	17	8	4	6	3	2	1	3
Otitis	3	2	..	..	1	..	..	5
Cæcitas	5	2	..	..	..	..	..	1
Nyctalopia	1	..	..	..	..	..	..	..
Amaurosis	4	3	1	5	2	..	..	1
Myopia	..	..	..	2	..	..	..	..
Cataractes	..	..	..	..	..	1	..	..
2. Circulatory System:								
Carditis	2	2	6	3	..	6	8	10
Pericarditis	1	3	1	2	4	6	3	1
Hypertrophia Cordis ..	14	14	1	2	5	9	2	14
Atrophia Cordis ..	1	..	..	1	..	..	..	..
Morbus Valv: Cordis ..	35	35	8	8	10	5	..	11
Morbus Cordis	4	..	..	..	..	..	..	..
Aneurisma Aortæ ..	5	2	1	..	..	1	..	..
Aneurisma	..	..	..	1	1	..	..	4
Varix	9	15	1	..	2	3	..	9
Angina Pectoris ..	2	1	..	..	..	..	..	..
Palpitatio Cordis ..	6	2	..	1	1	1	2	2
Arteritis	..	..	..	1	..	..	..	..
3. Respiratory System:								
Laryngitis	2	..	..	..	..	1	..	..
Bronchitis Acuta ..	13	..	1	..	..	5	9	15
„ Chronica ..	29	16	..	9	5			
Pleuritis	..	3	..	..	..	..	1	..
Pneumonia	2	1	1	..	..	..	..	..
Asthma	2	2	2	..	..	2	2	..
Œdema Glottidis ..	2	..	..	..	..	..	..	..
Hydrothorax	1	..	..	..	..	..	..	..
Emphysema	1	1	..	..	..	..	..	1
4. Digestive System:								
Gastritis	3	..	..	..	..	..	..	..
Enteritis	..	..	..	..	..	..	1	..
Dyspepsia	7	5	2	5	2	1	2	3

Appendix No. XXIX.—*continued.*

Stations..	Bengal.		Madras.			Bombay.		
Strength	42,575		12,621			12,329		
Diseases.	Men sent Home as Invalids during the Year.	Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.
			Discharge.	Change of Climate.		Discharge.	Change of Climate.	
Colica	1	..	..	..	..	..	..	..
Hæmatemesis	..	1	..	..	1	..	..	1
Hernia	14	10	1	2	2	3	..	2
Hæmorrhois	..	..	1	..	..	..	1	..
Fistula in Ano	1	6	..	1	..	..	1	2
Prolapsus Ani	..	..	..	1	..	..	..	..
Splenitis	15	9	..	2	..	..	10	9
Hepatitis Acuta ..	58	2	..	2	1	8	36	3
" Chronica ..	155	95	..	24	3			35
Icterus	..	1	..	..	..	..	..	1
Ascites	2	6	..	..	1	..	1	1
Cirrhosis	1	..	..	..	..	..	..	..
5. Urinary System:								
Nephritis	1	3	..	2	..	1	..	1
Nephria..	1	..	..	..	..	..	..	..
Ischuria..	1	..	.	..	1	..	..	2
Hæmaturia	..	1	..	..	..	..	..	..
Cystitis	1	..	..	..	..	1	..	..
Fistula in Perineo ..	..	1	..	..	..	..	..	1
Enuresis	..	1	..	..	..	..	..	..
Diabetes	1	..	..	1	..	..	1	..
Morbus Prostaticus ..	..	1	..	..	..	..	..	..
6. Reproductive System:								
Varicocele	1	..	2	1	..	1	..	..
Hydrocele	1	..	..	..	..	..	..	..
Orchitis (not Gonorrhœal)	13	5	..	..	1	1	1	2
Sarcocele	..	..	1	..	..	..	..	..
Spermatorrhœa.. ..	1	..	..	..	..	..	..	..
7. Locomotive System:								
Arthritis	7	2	..	..	..	..	..	1
Synovitis	3	2	..	..	..	..	..	3
Contractura	1	2	2	3	2	1	..	1
Periostitis	5	4	..	1	..	2	2	2
Exostosis	..	..	1	..	..	..	1	..
Caries	..	1	..	..	1	..	..	..
Necrosis	1	3	..	1	2	1	1	..
Curvatura Spinæ ..	..	..	1	..	..	..	..	..
Anchylosis	..	1	..	..	1	..	..	..
8. Integumentary System:								
Impetigo	..	..	..	1	..	..	..	..
Lepra	1	..	..	..	..	..	..	..
Phlegmon	2	..	..	..	..	..	..	..

Appendix No. XXIX.—*continued.*

Stations..	Bengal.		Madras.			Bombay.		
Strength	42,575		12,621			12,329		
Diseases.	Men sent Home as Invalids during the Year.	Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service as Invalids in England.	Men sent Home as Invalids during the Year.		Discharged the Service in England as Invalids.
			Discharge.	Change of Climate.		Discharge.	Change of Climate.	
Abscessus	2	2	..	1	1	..	..	..
Ulcus	21	2	2	3	2	..	2	3
IV. *Developmental Diseases.*								..
1. Atrophia	151	1	14	34	..	10	8	..
Debilitas	..	52	..	..	13	..	..	29
Senectus	..	..	..	..	..	1	..	..
V. *Violent Deaths or Diseases.*								
1. Accidental:								
Ambustio	1	..	..	..	..	..	..	..
Explosio	8	..	..	..	..	1	..	..
Insolatio	1	..	..	1	..	..	1	..
Fractura	8	8	3	..	1	..	..	5
Amputatio	..	2	2	1	2	..	..	..
Contusio	3	..	1	2	2	2	..	6
Commotio	..	..	1	..	..	..	..	..
Vulnus Sclopetarium ..	5	2	..	..	1	1	..	..
„ Incisum ..	2	..	..	1	..	..	..	..
Luxatura	2	..	4	..	..	2	..	1
Subluxatio	3	..	..	..	1	1	1	2
Disease not specified ..	..	6	..	..	..	..	..	..
Worn out	..	..	13	4	..	..	..	..
Total	1,415	778	146	360	186	176	225	407

APPENDIX No. XXX.

Abstract, showing the Ages of the Troops serving in the Bengal Presidency, and the Deaths at each Age, during the Year 1863.

[Note.—No returns were available from the 7th Hussars.]

	Under 20.		20–24.		25–29.		30–34.		35–39.		40 and Upwards.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
2nd Brigade, Royal Horse Artillery	10	..	293	8	317	12	149	3	64	4	6	1	839	28
5th " "	20	..	316	5	289	5	150	2	54	1	16	..	845	13
11th Brigade, Royal Artillery ..	4	..	194	3	582	10	301	4	66	1	9	..	1,156	18
16th " " ..	28	..	347	10	193	8	84	6	32	1	10	2	694	27
19th " " ..	26	4	180	9	280	18	108	4	88	3	14	1	696	39
22nd " " ..	62	..	298	13	169	7	80	8	39	4	7	..	655	32
24th " " ..	1	..	108	12	91	2	76	6	44	3	16	2	336	25
25th " " ..	43	4	118	8	87	5	44	3	20	2	4	1	316	23
Artillery Band	7	..	5	..	14	..	8	..	5	..	3	..	42	..
2nd Dragoon Guards	5	..	92	2	254	5	50	..	15	..	9	1	425	8
7th " "	4	..	120	1	323	2	92	..	14	..	4	..	557	3
8th Hussars	1	..	109	1	347	4	108	2	41	..	26	..	632	7
19th "	..	..	229	..	100	5	17	2	7	..	..	..	358	7
20th "	..	..	240	2	136	4	28	5	76	2	22	..	502	13
21st "	..	..	347	2	217	4	39	..	20	2	3	..	626	8
1st Battalion, 7th Foot	12	..	545	2	460	8	129	5	38	1	9	1	1,198	17
1st " 13th "	36	..	225	6	510	13	81	6	33	3	5	..	890	28
1st " 19th "	8	..	271	2	365	19	138	7	71	4	9	1	862	33
1st " 20th "	14	2	530	23	240	10	85	3	21	3	3	1	893	42
1st " 23rd "	11	..	17	3	569	10	374	4	92	2	39	1	1,102	20
27th Foot	59	1	109	3	517	10	101	1	94	1	23	..	903	16
34th "	7	..	462	2	280	5	83	2	13	2	..	..	845	11
35th "	94	..	481	2	293	10	110	8	31	2	12	1	1,021	23
38th "	35	..	477	3	336	7	101	4	16	..	3	..	968	14
2rd "	24	..	399	9	324	6	93	1	61	3	3	1	904	20

Appendix No. XXX.—*continued.*

ABSTRACT showing the Ages of the Troops serving in the Bengal Presidency—*continued.*

	Under 20.		20–24.		25–29.		30–44.		35–39.		40 and Upwards.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
43rd Foot	25	..	191	6	370	6	158	9	81	4	20	..	845	25
46th ,, ...	25	..	544	6	268	26	99	2	35	1	2	..	978	35
48th ,, ...	12	..	425	8	226	17	218	3	50	2	5	3	936	33
51st ,, ...	10	..	490	4	278	5	95	3	80	..	34	1	987	13
52nd ,, ...	20	..	286	5	399	13	132	2	69	1	18	..	924	21
54th ,, ...	34	..	414	9	332	2	157	6	53	..	13	..	1,003	17
71st ,, ...	11	..	352	14	336	13	171	7	53	6	4	..	927	40
77th ,, ...	5	..	420	42	306	27	112	6	40	2	9	1	892	78
79th ,, ...	190	..	370	1	315	6	104	10	11	3	..	..	990	20
80th ,, ...	11	..	403	6	346	3	153	7	54	2	14	1	981	19
81st ,, ...	19	..	272	3	364	10	246	8	119	2	5	1	1,025	24
82nd ,, ...	49	1	626	10	258	19	102	3	26	4	9	..	1,070	37
88th ,, ...	7	..	290	2	504	15	89	4	47	..	2	1	939	22
89th ,, ...	6	..	466	4	256	6	169	1	69	1	14	1	980	13
90th ,, ...	18	..	311	3	410	12	80	4	9	1	..	..	828	20
91st ,, ...	140	..	370	6	280	7	122	4	54	6	9	..	975	23
93rd ,, ...	29	..	336	2	444	9	117	3	23	..	1	1	950	15
94th ,, ...	12	..	223	..	354	2	100	1	45	1	6	..	740	4
97th ,, ...	67	1	625	8	230	10	52	1	31	2	2	..	1,007	22
98th ,, ...	16	..	476	..	248	10	149	2	99	3	11	1	999	16
101st ,, ...	3	..	622	15	253	19	171	5	55	7	5	..	1,109	46
104th ,, ...	84	..	372	3	192	6	26	..	83	2	16	..	773	11
107th ,, ...	7	..	222	9	65	19	16	3	19	4	4	..	333	35
2nd Battalion, Rifle Brigade ..	14	..	400	7	471	4	83	7	33	2	7	..	1,008	20
3rd ,, ,, ,, ..	14	..	478	1	414	13	92	3	8	..	1	..	1,002	17
Total	1,339	13	16,491	305	15,212	468	5,642	190	2,301	100	466	25	41,451	1,101

Five deaths Royal Artillery (Invalids, Brigade not known) and 12 deaths 7th Hussars omitted.

Appendix No. XXX.—*continued.*

ABSTRACT showing the Ages of the Troops serving in the Madras Command, and the Deaths at each Age, during the Year 1863.

	Under 20 Years.		20–24.		25–29.		30–34.		35–39.		40 and upwards		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
3rd Brigade, Royal Horse Artillery	21	..	187	1	224	4	100	1	54	1	10	1	596	8
14th „ Royal Artillery ..	18	..	164	2	254	8	100	3	22	..	2	..	555	13
17th „ „ ..	42	1	174	2	133	4	76	1	72	..	29	1	526	9
20th „ „ ..	39	..	240	5	303	7	167	2	78	2	22	2	849	18
23rd „ „ ..	12	..	207	5	256	8	144	5	98	1	25	..	742	19
1st Dragoon Guards	11	..	165	2	314	5	63	4	34	1	22	..	609	12
17th Lancers	11	..	146	2	294	5	78	6	9	..	11	1	549	14
1st Battalion, 1st Foot	10	..	364	2	393	7	155	7	53	1	8	1	983	18
1st „ 18th „	4	..	295	6	457	3	112	3	64	1	4	1	936	14
3rd „ 60th „	4	..	240	8	610	30	80	5	19	2	6	..	959	45
66th Foot	7	..	257	4	426	8	189	2	71	3	7	2	957	19
68th „	..	..	277	1	440	7	150	3	77	1	5	2	949	14
69th „	17	1	285	3	296	9	169	2	109	2	3	..	879	17
74th „	295	..	220	5	111	3	70	3	22	8	4	1	722	20
102nd „	28	..	347	6	134	5	109	2	73	1	17	1	708	15
105th „	75	..	365	5	104	3	41	1	18	2	12	..	615	11
108th „	10	..	25	..	122	2	50	2	5	1	1	1	213	6
Total ..	593	2	3,958	59	4,871	118	1,853	52	878	27	188	14	12,347	272

Five deaths Royal Artillery (Brigade not specified) and 3 deaths 2nd Battalion, 21st Foot omitted.

Appendix No. XXX.—*continued.*

Abstract showing the Ages of the Troops serving in the Bombay Command, and the Deaths at each Age, during the Year 1863.

	Under 20 Years.		20–24.		25–29.		30–34.		35–39.		40 and upwards.		Total.	
	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.	Strength.	Died.
4th Brigade, Royal Horse Artillery	2	..	136	1	169	2	135	..	128	..	18	2	588	5
14th „ Royal Artillery ..	3	..	129	2	346	3	119	2	16	..	2	..	615	7
18th „ „	99	1	359	1	344	10	217	3	117	3	20	3	1,156	21
21st „ „	27	..	82	4	294	1	108	4	83	2	21	..	615	11
Royal Engineers	..	..	16	..	21	1	4	..	1	..	..	..	42	1
3rd Dragoon Guards	26	..	249	1	229	2	36	3	25	1	12	..	577	7
6th Dragoons	1	..	252	1	285	2	65	3	11	1	16	..	680	7
1st Battalion, 4th Foot	13	..	635	1	174	5	89	1	44	..	18	..	973	7
28th Foot	9	..	68	1	432	8	282	5	159	2	46	..	996	16
33rd „	6	..	295	1	466	9	162	5	57	2	12	..	998	17
44th „	8	..	299	3	358	3	197	3	104	2	16	1	982	12
56th „	18	..	331	4	308	4	119	2	64	5	16	..	856	15
72nd „	33	..	376	2	362	8	113	1	56	1	8	..	948	12
95th „	44	..	446	6	475	5	41	6	3	..	1	..	1,010	17
103rd „	96	..	154	3	256	2	174	6	57	5	..	..	737	16
106th „	1	..	158	2	64	1	153	6	67	2	7	1	450	12
109th „	1	..	143	..	280	2	214	4	71	3	40	4	749	13
Total	387	1	4,128	33	4,863	68	2,228	54	1,063	29	253	11	12,922	196

Three deaths omitted (Royal Artillery Brigades not specified).

APPENDIX No. XXXI.

Abstract, showing the cases of Sickness and Deaths among Troops on board Ship, proceeding on Foreign Service.

Stations	India and China, Ceylon and Cape.		Mediterranean.		Australia and New Zealand.	
Number of Men Embarked	9,395		103		1,629	
Average Annual Strength	2,059		8		453	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Variola	24	..	..	..	..	..
Scarlatina	3	1	..	..	..	..
Tonsillitis	106	..	..	..	11	..
Influenza	8	..	..	..	5	..
Ophthalmia	54	..	..	..	8	..
Erysipelas	7	..	..	..	1	..
Furunculus	54	..	1	..	4	..
Anthrax	3	..	..	..	..	..
Dysenteria Acuta	3	..	..	..	1	..
„ Chronica	8	..	...	..	..	..
Diarrhœa	101	..	..	..	16	..
Cholera	3	1	..	..	..	..
Febris Intermittens	10	..	..	..	4	..
„ Remittens	2	..	..	..	..	..
„ Continua	51	3	..	..	25	..
Rheumatismus Acutus	26	..	..	..	10	..
„ Chronicus	52	..	..	..	6	..
Parotitis	..	..	..	..	1	..
Diphtheria	..	..	..	..	1	..
2. Enthetic:						
Syphilis Primaria	205	..	2	..	28	..
„ Secundaria	67	..	..	..	20	..
Iritis Syphilitica	15	..	..	..	..	..
Bubo	55	..	..	..	12	..
Gonorrhœa	144	..	3	..	13	..
Phymosis, &c.	4	..	..	..	..	..
Orchitis (Gonorrhœal)	22	..	..	..	6	..
Strictura Urethræ	1	..	..	..	1	..
Verrucæ	5	..	..	..	..	..
Ulcus Penis	1	..	..	..	..	..
3. Dietic:						
Scorbutus	14	..	..	..	..	..
Purpura	2	..	..	..	1	..
Ebriositas	1	..	..	..	..	..
4. Parasitic:						
Porrigo	2	..	..	..	..	..
Scabies	42	..	..	..	2	..
Ascaris Lumbricoides	2	..	..	..	..	..
Vermes	1	..	..	..	..	..

Appendix No. XXXI.—*continued.*

Stations	India, China, Ceylon, & Cape.		Mediterranean.		Australia and New Zealand.	
Number of Men Embarked ..	9,395		103		1,629	
Average Annual Strength ..	2,059		8		453	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
II. *Constitutional Diseases.*						
1. Diathetic:						
Anæmia	2	..	..	..	..	..
Anasarca	3	..	..	..	1	..
2. Tubercular:						
Scrofula	7	..	..	..	3	..
Phthisis Pulmonalis	10	2	..	..	1	..
Hæmoptysis	16	..	..	..	..	..
III. *Local Diseases.*						
1. Nervous System:						
Myelitis	1	..	..	..	..	..
Apoplexia	2	..	..	..	1	1
Paralysis..	1	..	..	..	..	..
Mania	3	..	..	..	..	..
Amentia	2	..	..	..	..	..
Epilepsia..	7	..	..	..	..	..
Cephalæa..	7	..	..	..	1	..
Neuralgia	3	..	..	..	..	..
Dysecœa	2	..	..	..	..	..
Otitis	15	..	..	..	..	..
Corneitis..	1	..	..	..	..	..
Sclerolitis	1	..	..	..	..	..
Odontalgia	1	..	..	..	..	..
Sea Sickness	4	..	..	..	..	..
Fistula Lachrymalis	1	..	..	..	..	..
2. Circulatory System:						
Morbus Valv: Cordis	3	..	..	..	..	..
Varix	2	..	..	..	..	..
3. Respiratory System:						
Laryngitis	1	..	..	..	..	..
Bronchitis Acuta	65	..	..	..	24	..
" Chronica	20	..	..	..	3	..
Pleuritis	8	..	..	..	8	..
Pneumonia	10	1	..	..	..	..
Hydrothorax	1	..	..	..	..	..
Emphysema	1	..	..	..	..	..
4. Digestive System:						
Pharyngitis	2	..	..	..	..	..
Gastritis	1	..	..	..	..	..
Peritonitis	1	..	..	..	..	..
Obstipatio	1	..	..	..	..	..
Dyspepsia	38	..	..	..	14	..
Gastralgia	1	..	..	..	..	..
Colica	10	..	..	..	1	..
Hæmatemesis	1	..	..	..	..	..
Hernia	9	..	..	..	1	..

Appendix No. XXXI.—*continued.*

Stations	India, China, Ceylon, & Cape.		Mediterranean.		Australia and New Zealand.	
Number of Men Embarked ..	9,395		103		1,629	
Average Annual Strength ..	2,059		8		453	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Hæmorrhois	9	..	..	..	3	..
Fistula in ano	2	..	..	..	..	..
Splenitis	1	..	..	..	..	..
Hepatitis Acuta	4	..	..	..	..	..
„ Chronica	1	..	..	..	2	..
Icterus	9	..	..	..	2	..
5. Urinary System:						
Nephria	..	..	..	..	1	1
Hæmaturia	1	..	..	..	..	..
Enuresis	1	..	..	..	..	..
6. Reproductive System:						
Hydrocele	1	..	..	..	..	..
Orchitis (not Gonorrhœal)	18	..	..	..	4	..
7. Locomotive System:						
Arthritis	2	..	..	..	..	..
Synovitis	1	..	..	..	..	..
Contractura	1	..	..	..	..	..
Caries	2	..	..	..	..	..
Necrosis	1	..	..	..	..	..
8. Integumentary System:						
Eczema	22	..	..	..	1	..
Herpes	5	..	..	..	..	..
Ecthyma	1	..	..	..	..	..
Intertrigo	1	..	..	..	..	..
Pemphigus	1	..	..	..	..	..
Phlegmon	119	..	..	..	8	..
Abscessus	68	..	..	..	5	..
Paronychia	31	..	..	..	..	..
Ulcus	112	1	..	..	47	..
IV. *Developmental Diseases.*						
4. Diseases of Nutrition:						
Atrophia	3	..	..	..	..	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	35	..	..	..	3	..
Insolatio	2	..	..	..	1	..
Submersio	1	3	..	..	1	1
Fractura	16	..	..	..	7	..
Contusio	74	..	..	..	13	..
Commotio	1	..	..	..	..	..
Vulnus Incisum	60	..	..	..	1	..
Luxatura	3	..	..	..	..	..
Subluxatio	24	..	..	..	7	..
Vesiculæ Pedis	5	..	..	..	..	..
6. Punitus	5	..	..	..	..	..
Total	2,000	12	6	..	335	3

APPENDIX No. XXXII.

Abstract, showing the cases of Sickness and Deaths among Troops on board Ship returning from Foreign Service.

Stations	From India, China, Ceylon, and Cape.		From West Indies.		From British America.	
Number of Men Embarked	2,384		212		413	
Average Annual Strength	673		23		23	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Tonsillitis	6	..	..	..	2	..
Influenza	1	..	..	..	..	..
Ophthalmia	114	..	..	..	1	..
Erysipelas	2	..	..	..	..	..
Furunculus	2	..	..	..	1	..
Anthrax	1	..	..	..	..	..
Dysenteria Acuta	42	5	..	..	..	..
„ Chronica	4	3	..	..	..	..
Diarrhœa	99	5	..	..	..	..
Cholera	3	3	..	..	..	..
Febris Intermittens	145	..	6	..	..	..
„ Remittens	4	..	..	..	..	..
„ Typhoides	1	..	..	..	..	..
„ Continua	5	1	..	..	1	..
Rheumatismus Acutus	42	..	..	..	..	..
„ Chronicus	6	..	..	..	..	..
2. Enthetic:						
Syphilis Primaria	18	..	4	..	3	..
„ Secundaria	6	..	..	..	..	..
Bubo	14	..	..	..	..	..
Gonorrhœa	22	..	1	..	..	..
Orchitis (Gonorrhœal)	3	..	..	..	..	..
3. Dietic:						
Scorbutus	3	..	..	..	..	..
Purpura	3	..	..	..	..	..
4. Parasitic:						
Porrigo	2	..	..	..	..	..
Scabies	4	..	..	..	..	..
Tænia Solium	1	..	..	..	..	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Lumbago	1	..	..	..	..	..

Appendix No. XXXII.—*continued.*

Stations	From India, China, Ceylon, and Cape.		From West Indies.		From British America.	
Number of Men Embarked ..	2,384		212		413	
Average Annual Strength ..	673		23		23	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
2. Tubercular:						
Phthisis Pulmonalis	3	1	..	..	..	..
III. *Local Diseases.*						
1. Nervous System:						
Encephalitis	1	..	..	..	..	..
Amentia	1	..	..	..	..	..
Epilepsia	2	..	..	..	..	..
Cephalæa	1	..	..	..	..	..
Neuralgia	1	..	..	..	..	..
Otitis	2	..	..	..	..	..
2. Circulatory System:						
Endo-carditis	..	1	..	..	..	..
3. Respiratory System:						
Bronchitis Acuta	21	..	6	..	2	..
„ Chronica	15	..	..	..	..	..
Pneumonia	3	..	..	..	..	..
Pleurodynia	2	..	..	..	..	..
4. Digestive System:						
Enteritis	..	..	1	..	..	..
Obstipatio	5	..	..	..	..	..
Dyspepsia	8	..	..	..	..	..
Colica	3	..	2	..	..	..
Hæmatemesis..	1	..	..	..	..	..
Hernia	2	..	..	..	..	..
Hæmorrhois	2	..	..	..	..	..
Hepatitis Acuta	7	2	..	..	..	..
„ Chronica	7	1	..	..	..	..
Icterus..	1	..	..	..	..	..
5. Urinary System:						
Cystitis	2	..	..	..	..	..
Dysuria	2	..	..	..	..	..
6. Reproductive System:						
Orchitis (not Gonorrhœal) ..	6	..	..	..	..	..
7. Integumentary System:						
Urticaria	2	..	..	..	..	..
Eczema	..	..	2	..	..	..
Herpes	2	..	..	..	..	..
Phlegmon	8	..	4	..	..	..
Abscessus	20	1	..	..	..	..
Paronychia	2	..	..	..	..	..
Ulcus	24	..	2	..	..	..

Appendix No. XXXII.—*continued.*

Stations	From India, China, Ceylon, and Cape.		From West Indies.		From British America.	
Number of Men Embarked ..	2,384		212		413	
Average Annual Strength ..	678		23		28	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
IV. *Developmental Diseases.*						
1. Atrophia..	3	..	..	..	..	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	8	..	..	..	..	..
Insolatio	1	..	..	..	..	..
Submersio	..	1	..	..	..	..
Fractura	1	..	1	..	..	..
Contusio	11	..	..	..	1	..
Vulnus Incisum	4	..	2	..	..	..
Luxatura	1	..	..	..	..	..
Subluxatio	5	..	..	..	..	..
Total	734	24	81	..	11	..

APPENDIX XXXIII.

ABSTRACT, showing the cases of Sickness and Deaths among Troops on board ship proceeding from one Colony or Station to another.

Stations	India, Birmah, and Ceylon to New Zealand.		Other Stations.		West Indies and Western Africa. Black Troops.	
Number of Men Embarked ..	2,347		7,811		2,348	
Average Annual Strength ..	347		149		168	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
I. *Zymotic Diseases.*						
1. Miasmatic:						
Tonsillitis	14	..	1	..	1	..
Influenza	..	..	1	..	..	..
Ophthalmia	24	..	9	..	4	..
Erysipelas	3	..	..	..	1	..
Furunculus	2	..	8	..	1	..
Dysenteria Acuta	30	1	..	..	4	1
„ Chronica	14	1	1	..	..	..
Diarrhœa	43	..	13	..	8	..
Febris Intermittens	15	..	1	..	5	..
„ Remittens	1	..	..	..	5	..
„ Continua	49	2	10	..	..	..
Rheumatismus Acutus ..	4	..	2	..	1	..
„ Chronicus ..	6	..	..	..	3	..
2. Enthetic:						
Syphilis Primaria	24	..	4	..	24	..
„ Secundaria	8	..	2	..	4	..
Ulcus Penis	1	..	..	..	..	..
Bubo	10	..	2	..	7	..
Gonorrhœa	19	..	4	..	18	..
Orchitis (Gonorrhœal) ..	..	..	1	..	2	..
3. Dietic:						
Ebriositas	1	..	1	..	..	..
II. *Constitutional Diseases.*						
1. Diathetic:						
Lumbago	1	..	..	..	..	..
Anasarca	1	..	1	..	..	..
2. Tubercular.						
Phthisis Pulmonalis	1	..	..	..	1	1
III. *Local Diseases.*						
1. Nervous System:						
Amentia	1	..	..	..	..	..
Cephalæa	2	..	..	..	..	..
Otitis	1	..	1	..	..	..
Odontalgia	3	..	..	..	..	..
Cæcitas	1	..	..	..	..	..
2. Circulatory System:						
Morbus Valv. Cordis	..	..	1	..	..	..

Appendix No. XXXIII.—*continued.*

Stations	India, Birmah, and Ceylon to New Zealand.		Other Stations.		West Indies and Western Africa. Black Troops.	
Number of Men Embarked ..	2,347		7,811		2,348	
Average Annual Strength ..	347		149		168	
Diseases.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
3. Respiratory System:						
Bronchitis Acuta	36	..	3	..	17	..
„ Chronica	3	..	1	..	1	..
Pleuritis	2	..	..	..	1	..
Pneumonia	2	1	..	..	4	2
4. Digestive System:						
Obstipatio	1	..	..	..	..	..
Dyspepsia	6	..	1	..	1	..
Colica	8	..	..	..	..	..
Hæmatemesis	..	..	1	..	..	..
Hæmorrhois	1	..	1	..	1	..
Hepatitis Acuta	5	..	..	..	..	..
„ Chronica	2	..	..	..	..	..
Icterus	..	..	..	..	1	..
5. Urinary System:						
Nephria	1	..	..	..	..	..
6. Reproductive System:						
Orchitis (not Gonorrhœal) ..	7	..	1	..	..	..
7. Locomotive System:						
Arthritis	1	..	..	..	..	..
Exostosis	..	..	..	..	1	..
8. Integumentary System:						
Eczema	..	..	1	..	1	..
Herpes	3	..	..	..	..	..
Impetigo	..	..	1	..	..	..
Psoriasis	1	..	..	..	..	..
Ecthyma	1	..	..	..	..	..
Mentagra	1	..	..	..	..	..
Phlegmon	20	..	35	..	..	..
Abscessus	8	..	..	..	3	..
Paronychia	4	..	..	..	2	..
Ulcus	32	..	10	..	4	..
V. *Violent Deaths or Diseases.*						
1. Accidental:						
Ambustio	3	..	1	..	..	..
Gelatio	2	..	..	..	..	..
Insolatio	1	1	..	..	..	..
Fractura	1	..	1	..	..	..
Contusio	21	..	3	..	1	..
Vulnus Incisum	9	..	6	..	5	..
Subluxatio	2	..	1	..	..	..
6. Punitus	..	..	..	..	1	..
Total	468	6	125	..	128	4

REPORT

OF THE

SANITARY BRANCH FOR 1863.

BY

T. G. LOGAN, M.D.,

INSPECTOR-GENERAL OF HOSPITALS AND HEAD OF THE
SANITARY BRANCH.

TO THE DIRECTOR-GENERAL

OF THE

ARMY MEDICAL DEPARTMENT.

SIR,

I HAVE the honour to submit to you the Report of the Sanitary Branch of the Army Medical Department for the year 1863.

In reference to the contents of this section of the volume, the following important contributions may herein be specified:—

I. A Report on the Ventilation of Rooms in the Permanent Barracks of Aldershot, by Dr. De Chaumont, Staff Surgeon, and, by the same officer, a Table of the Nutritive Value of Diets used in the Military Hospitals.

II. A Report on the Royal Victoria Hospital, Netley, by Inspector-General Dr. Anderson, the first since the opening of the establishment. This Report is accompanied by a Table showing the Results of an Examination of the Atmosphere of one of the Wards, by Medical Candidate Dr. McCully.

III. An Account of the recent Epidemic of Yellow Fever at Bermuda, by Deputy Inspector-General Mr. Barrow. This special Report it has been deemed very desirable to publish without the delay which otherwise would, in the usual course, have consigned it to the volume for 1864.

IV. A special Report, in connection with the West Coast of Africa, by Staff Assistant-Surgeon Gardiner. This contains much that bore prominence in the sanitary urgencies of the late Ashantee War.

V. Attaching to the Cape of Good Hope, a special Report on Ophthalmia, which has been prevalent at different times among the Troops, by Deputy Inspector-General Mr. Lawson.

VI. Under the head of China is given a special Report, by Dr. Home, Deputy Inspector-General, on Shanghai, which, accompanied by that of Dr. Snell, Surgeon 99th Regiment, on Hong Kong and Kowloon, affords much information in regard to late sanitary conditions of this Command.

VII. Referring to an intimation given in the previous Department volume of an intention to publish seriatim Reports, from time to time, of the Military Districts of India; the selected Sanitary Memoranda of Inspector-General Dr. Beatson, a Report on the Bengal Presidency District by Dr. C. A. Gordon C.B., Deputy Inspector-General, that of Dr. Inglis C.B., Deputy Inspector-General, on the Madras Presidency, and one on Singapore, by Assistant-Surgeon Ferguson, of Her Majesty's Indian Service, occupy fully such space in this year's volume as their respective interests can be condensed to.

VIII. A Paper on Suez by Dr. Fraser, Surgeon 10th Hussars, who held medical charge there during the period of the overland passages of Her Majesty's regiments to India in time of the great Mutiny. This document will be found of especial interest in anticipation of the arrangements now in progress for the future transit, by this route, of corps in the annual course of relieving regiments from India, and for the more frequent opportunities of sending home invalided soldiers.

IX. The Annual Review of the Progress of Hygiene, by Dr. Parkes, F.R.S., embracing, as usual, all the salient points attaching to the further advance of Sanitary Science. Dr. Parkes has additionally contributed a Paper on his Examination of Professor Liebig's "Extractum Carnis."

I have the honour to be,
Sir,
Your most obedient humble servant,
T. G. LOGAN,
Inspector-General.

6, Whitehall Yard,
1865.

SANITARY REPORT FOR 1863.

THE HOME QUARTERS OF THE ARMY.

REPORT ON THE VENTILATION OF ROOMS IN THE PERMANENT BARRACKS AT ALDERSHOT.

By Staff Assistant-Surgeon De Chaumont, M.D.

Army Medical School, Royal Victoria Hospital,
Netley, March 20, 1865.

Sir,

I have the honour to forward to you the report of the experiments made on the ventilation of the Permanent Infantry Barracks at Aldershot, on the 3rd, 4th, and 5th of March. Accompanying it is a Table in which the observations are arranged for the convenience of comparison.

In addition to the observations in the report and Table, I was requested by Inspector-General Dr. T. Ross Jameson, to visit the Female Hospital and some of the huts occupied by married soldiers, in which the ventilating stoves had been placed. It had been stated that these stoves did not act properly,—indeed, that in some cases, the draught through the air-chamber was outwards instead of inwards. A careful examination with the anemometer showed that, in every case, a current of air, of a temperature at least 10° above the external air, was passing in while the fire was burning. This current, in some of the huts where the inlet area was very small, amounted to from 700 to 1,000 cubic feet per hour. In the Female Hospital, where the louvre was about the same size as those in the barracks, the delivery was estimated at from 6,000 to 14,000 cubic feet per hour. The discharge by the chimney amounted to from 8,000 to 12,000 cubic feet per hour. The extraction by the wooden shafts was very unsatisfactory, from their shortness, as was observed in the case of the upper room (No. 22) in the barracks.

I was also requested to examine the guard-room cells at the permanent barracks. These are ventilated by the following arrangement:—

Inlets.—One grating, communicating with an external wall at some distance off.

One grating above the door, opposite to the former, communicating directly with the guard-room.

Outlet.—One square extraction-shaft from centre of roof.

An experiment, by inserting a diaphragm in the shaft, had been made for the purpose of converting one portion into an inlet, and the other into an outlet. This, however, was unsuccessful; both remained outlets, probably in consequence of the presence of the gratings.

The extraction seemed to work well. During the estimation there were four people in the cell, and a candle was burning. The air was then going out at the rate of 7,700 cubic feet per hour.

The arrangement for inlet is bad, the one grating being at too great a distance from the external wall, and the other admitting only the already contaminated air of the guard-room.

These observations, as not belonging to the subject of the report, were not included in it.

I have, &c.,
(Signed) F. de Chaumont, M.D.,
Staff Assistant Surgeon.

To the Director-General,
Army Medical Department.

Report on the Ventilation of Rooms in the Permanent Barracks at Aldershot.[*]

Having proceeded to Aldershot, in compliance with a memorandum from the Director-General, for the purpose of applying scientific tests to the investigation of the ventilation of certain barrack-rooms, I have the honour to report as follows:—

There are four systems of ventilation in use, one common to all the permanent barracks, and the other three adapted to certain rooms in the centre block of the Infantry barracks, as a matter of experiment.

1. The first system is the original one adopted at the first building of the barracks. The rooms are long (50 feet by 22), having at one end the door, flanked by two windows, and two other windows at the opposite end of the long diameter. These latter look out on the open air, but the door and flanking windows open into a verandah overlooking a court between the two buildings of the block. This court is quite open at the ends, but is roofed in with glass.

Room No. 10, on the first floor, was taken as representing this system. The plan of ventilation consisted in the following:—

For admission of fresh air, three gratings, 9" by 6", in external walls, close to the door.

For extraction of foul air, one grating 9″ by 6″, in party wall, communicating with a 6" vertical flue near the roof.

N.B.—In most of the rooms there are two of these gratings.

The actual measurement of the inlet area, at its opening into the room, gave 5·25 square inches for each of the low gratings. Say, in round numbers of inlet area, 16 square inches. The actual measurement of high grating gave, of outlet area, 12 square inches. To this add the chimney, 58 square inches. Total outlet, 70 square inches.

The number intended to occupy the room is 24, and the cubic space, by the official return, is stated to be 13,200 cubic feet, or 550 per man. By actual measurement, making the necessary deductions for bulky furniture, bodies of occupants, &c., the amount is 13,032 cubic feet, or 543 per man.

The inlet area per man would be 0·66 square inches; the outlet area per man 0·5 square inches; ditto, including chimney, 2·9 square inches.

The total inlet and outlet area per man would thus be 3½ square inches, instead of 48, as it ought to be.

The actual number of men occupying the room at the time of examination was 18, and the cubic space for each was thus increased to 723. Although this is 123 feet above the amount recommended as a minimum, the deficiency of inlet and outlet area rendered the ventilation very bad. With this reduced number, the inlet area per man became 0·9 square inches, the outlet area 0·7 square inches; or, with the chimney, about 4 square inches. The total outlet and inlet per man being under 5 square inches instead of 48.

During the day, on the 3rd of March, there being a good fire on, a strong draught, and the door frequently open, nine men had been in for some time, one of whom was smoking. The air was collected, and the carbonic acid determined by Pettenkoffer's method. The result showed ·867 in 1,000 volumes. In the space between the buildings, the air contained only ·490, the normal amount in the open air being ·400. At 11.20 p.m. the room was visited; 18 men had been in for more than two hours, the doors and windows were shut, the fire was out, and there was no perceptible movement of air in the chimney. All the gratings were acting as inlets, and the room smelt extremely close. The amount of carbonic acid was 1·09 in 1000 volumes.

The thermometer read as follows:—
Dry bulb, 59°; wet bulb, 54°·5. Temperature of the dew point, 50°·04.
Elastic tension of vapour, 0·367.
Vapour in a cubic foot of air, 4·1 grains.
Degree of humidity (saturation 100), 79.

In the external air,—
Dry bulb, 45°; wet bulb, 40°·5. Temperature of the dew point, 35°·3.
Elastic tension of vapour, 0·206.

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[*] In making these observations I was ably assisted by Serjeant H. J. Sylvester, Army Hospital Corps.

Vapour in a cubic foot of air, 2·4 grains.
Degree of humidity (saturation 100), 69.

At 12, midnight, on the 4th of March, the gratings in the external walls were acting as inlets, and admitted (by Casella's anemometer) 594 cubic feet per hour. This gave 25 cubic feet per man on the total number, and 33 on the actual number of occupants. The high gratings were acting as very feeble outlets, the rate hardly admitting of measurement, and there was no perceptible movement of air in the chimney. A considerable interchange must have gone on through the chinks of the doors and windows, which were all shut. The room smelt very close and unpleasant. The carbonic acid (determined near the door) gave 1·154 per 1,000 volumes.

A second determination, at further end of the room, gave 1·285 per 1,000 volumes. The thermometer read the same as the night before, but the external air was colder.

External air,—

Dry bulb, 44°: wet bulb, 41°·5. Dew point, 38°·5.
Elastic tension of vapour, 0·234.
Vapour in a cubic foot of air, 2·7 grains.
Degree of humidity (saturation 100), 80.
Degree of humidity in room, 79.

At 1·30 A.M. on the 5th instant, the room smelt very close, the inlets and outlets being as before. The windows were covered with moisture. The thermometer read,—

Dry bulb, 60°·5; wet ditto, 55°. Dew point, 49°·8.
Elastic tension of vapour, 0·364.
Vapour in a cubic foot of air, 4·05 grains.
Degree of humidity (saturation 100), 66.

External air,—

Dry bulb, 40°; wet ditto, 38°. Dew point, 35°·4.
Elastic tension of vapour, 0·267.
Vapour in a cubic foot of air, 2·4 grains.
Degree of humidity (saturation 100), 84.

At 3 A.M. on the 5th instant, the general conditions were much the same, and the carbonic acid was again determined.

1st determination (near the door) gave 1·360 per 1,000 volumes.
2nd ditto (among the cots), 1·408 per ditto.

The thermometer read,—

Dry bulb, 61°; wet ditto, 55°. Dew point, 49°·8.
Elastic tension of vapour, 0·358.
Vapour in a cubic foot of air, 4 grains.
Degree of humidity (saturation 100), 67.

In the external air,—

Dry bulb, 37°; wet ditto, 33°. Dew point, 27°·3.
Elastic tension of vapour, 0·149.
Vapour in a cubic foot of air, 1·7 grains.
Degree of humidity (saturation 100), 68.
It had been raining a good part of the night.

From the above observations, it will be seen that the ventilation is extremely bad, the amount of carbonic acid rising, even in the daytime, to twice, and at night to more than three times the normal quantity. The smell was extremely offensive, but the actual amount of organic matter was not determined. In spite of the ventilation being so deficient, the position and arrangement of the inlet gratings near the floor cause a cold draught, which induces the men sleeping near them to close them up.

2nd System.—The second system of ventilation consists of the first, with the addition of four Sheringham valves in the external walls. This is represented by Room No. 2 on the ground-floor.

For the admission of fresh air, three low gratings, as in No. 10 Room; four Sheringham valves, 13½" × 6", two near door, and two at opposite end, near the windows.

For the extraction of foul air, two high gratings, as in No. 10; one Arnott's ventilator, 9" × 6" in chimney-breast (closed, and not in working order).

The total inlet area, by actual measurement, gave 216 square inches.

The total outlet area gave 24 square inches; to which add the chimney, 58 square inches; making a total of 82 square inches.

The number intended to occupy the room is 24, and the cubic space, by the official return, is stated to be 13,200 cubic feet, or 550 per man. By actual measurement, deduction being made, it is 13,032, or 543 per man.

The inlet area per man would be 9 square inches; the outlet area per man 1 square inch. Adding the chimney, the total outlet area would be 3·4. The total inlet and outlet area per man would thus be 12·4 square inches, instead of 48.

The actual number of men occupying the room was 15, and the cubic space for each was thus increased to 871.

The ratio of inlet area was 14·4 square inches; ratio of outlet area, 1·60; ditto, with chimney, 5·47. Total inlet and outlet area per man, 19·87, instead of 48.

On the 3rd of March, at 11 A.M., with a good fire and few people in the room, the door wide open, and a breeze blowing, Neumann's anemometer showed a discharge, by the chimney, of 4·264 linear feet a second, or, the dimension of the aperture being taken at ·4 square feet, 6,140 cubic feet per hour. Air was coming at the door at the rate of 105,000 cubic feet per hour. The carbonic acid was ·664 in 1,000 volumes.

The thermometer read as follows:—

Dry bulb, 59°; wet ditto, 55°. Dew point, 51°·4.
Elastic tension of vapour, 0·380.
Vapour in a cubic foot of air, 4·3.
Degree of humidity (saturation 100), 76.

External air,—

Dry bulb, 45°; wet ditto, 40°·5. Dew point, 35°·3.
Elastic tension of vapour, 0·206.
Vapour in a cubic foot of air, 2·4.
Degree of humidity (saturation 100), 69.

At 2·15 P.M., on the 3rd instant, eight or nine men had been smoking for an hour. Door and window shut. Room smelt rather close.

Carbonic acid, ·860 in 1,000 volumes.

At 3·15 P.M., when the measurements were made, the two Sheringham valves at the door were outlets, those opposite at the windows, strong inlets. All the other openings, except the chimney, were inlets.

On the 4th instant, at 10.30 P.M., 15 men had been in the room for more than an hour and a-half.

Carbonic acid (near the door), ·863 in 1·000. Ditto (between two cots) ·919 in 1,000.

Thermometer:—Dry bulb, 55°; wet ditto, 52°. Dew point, 49°·1.
Elastic force of vapour, 0·349.
Vapour in a cubic foot of air, 3·9.
Degree of humidity (saturation 100), 81.

External air, under shelter,—

Dry bulb, 44°; wet ditto, 41°·5. Dew point, 38°·5.
Elastic force of vapour, 0·234.
Vapour in a cubic foot of air, 2·7.
Degree of humidity (saturation 100), 80.

Outside in the rain,—

Dry bulb, 43°; wet ditto, 42°. Dew point, 40°·8.
Elastic force of vapour, 0·255.
Vapour in a cubic foot of air, 2·9.
Degree of humidity (saturation 100), 92.

At 1.10 A.M. on the 5th instant, the delivery of air was as follows:—

By door Sheringham valves	6,907	cubic feet per hour.
By low gratings	303	„
Total	7,210	„

Discharge:—Chimney, not appreciable. Window, Sheringhams, and high gratings, difficult to measure; presumably, about equal to inlet.

The delivery per man, calculated on the total number, gave 300 cubic feet. On actual number of occupants, 480.

The discharge presumably about the same.

The thermometer read,—

Dry bulb, 56°; wet ditto, 54°. Dew point, 52°·1.

Elastic force of vapour, 0·391.

Vapour in a cubic foot of air, 4·4.

Degree of humidity (saturation 100) 87.

At 5 A.M. on the 5th instant, the room felt very close.

Carbonic acid (near the door), ·962 in 1,000. Ditto (between two cots), ·919 in 1,000.

Thermometer:—Dry bulb, 56°; wet ditto, 53°. Dew point, 50°·2.

Elastic force of vapour, 0·365.

Vapour in a cubic foot of air, 4·1.

Degree of humidity (saturation 100), 81.

On testing for organic matter* in the air, it was found that ·00001 gramme of permanganate of potash was destroyed by 7 cubic feet of air. The sediment, collected and examined microscopically, showed the presence of the following:—straw, woody fibre, grass, hair, cotton, wool, linen, sand, amorphous particles, debris of various kinds, epithelium (a few scales), greenish-coloured substance, undetermined.

3rd System. The third system of ventilation consists of the first, with the addition of four louvres, War Office pattern, in the external walls, two near the door, and two near the windows. This is represented by Room No. 13 on the first floor.

For admission of fresh air, three gratings in external walls near floor, as before; four louvred ventilators, War Office pattern, 1′ 6″ × 9″ at upper corners of external walls.

For extraction of foul air, two high gratings in party-wall, as before.

Total inlet area,—

	Sq. In.
Low gratings (double)	16 16
Louvres	216
Total	248

Outlet area,—

	Sq. In.
High gratings	24
Chimney	58
Total	82

The number intended to occupy the room is 26, and the cubic space, by the official return, is stated at 14,612 cubic feet, or 562 per man. By actual measurement, with the necessary deductions, it was found to be 13,546, giving 521 per man.

The inlet area would be, per man, 9·5 square inches. The outlet area would be, per man, 3·1 square inches.

The total outlet and inlet area would thus be, per man, 12·6 square inches, instead of 48.

The actual number of men occupying the room was 18, thus raising the cubic space per man to 752 cubic feet.

The inlet area would then be, per man, 13·8 square inches. The outlet area would be, per man, 4·6 square inches.

The total inlet and outlet area per man would thus be 18·4 square inches, instead of 48.

On the 3rd of March, at 4·5 P.M., several men had been in the room for some time, the door was open, and there was a good fire and a strong draught.

Carbonic acid, equal ·680 in 1,000 volumes.

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* Urea, if present in the air, is not included here, as it has no effect on the permanganate of potash.

At 11·30 P.M., 18 men had been in for 2½ hours. All the inlets closed except one louvre, and no perceptible movement of air in the chimney. All the openings, when opened, feeble outlets. Room smelt very close.

Carbonic acid, 1·072 in 1,000.

Thermometer:—Dry bulb, 61°; wet ditto, 58°. Dew point, 55°·4.

Elastic tension of vapour, 0·439.

Vapour in a cubic foot of air, 4·9 grains.

Degree of humidity (saturation 100), 82.

On the 5th instant, at 1·35 A.M., the ventilators had been kept open during the night.

Delivery of air (Neumann's anemometer) by door-louvres, low gratings, and high ditto, 2,789 cubic feet per hour.

Discharge:—Chimney, not appreciable. Window louvres, probably same as delivery.

This would give per man, on the total number, 104 cubic feet per hour.

On the actual number, 155 cubic feet per hour of delivery, and, presumably, the same amount of discharge.

At 3.30 A.M., the conditions being as above, the room was very close.

Carbonic acid (near door) 1·030 in 1,000. Ditto (among the beds), 1·260 in 1,000.

Thermometer:—Dry bulb, 54°; wet ditto, 50°. Dew point, 46°·1.

Elastic force of vapour, 0·310.

Vapour in a cubic foot of air, 3·5 grains.

Degree of humidity (saturation 100), 74.

At 4.30 A.M., room still close; smell of urine strong; urine tub nearly full, and standing close to the can containing drinking-water.

Carbonic acid (near door) 962 in 1,000. Ditto (near beds), 1·082 in 1,000.

Thermometer:—Dry bulb, 56°; wet ditto, 51°. Dew point, 46°·3.

Elastic force of vapour, 0·317.

Vapour in a cubic foot of air, 3·5 grains.

Degree of humidity (saturation 100), 70.

It will be observed that this system is an improvement on the first, but is not so good as the second (*i.e.* with the Sheringham valves). The latter, with a smaller inlet area, delivered more than twice the quantity of fresh air; and the discharge of foul air was, presumably, in the same ratio. The variation in the amount of carbonic acid is in the inverse ratio of the delivery and discharge.

It is proper, however, to observe, that there were actually 18 men occupying Room No. 13 (third system), and only 15 men occupying Room No. 2 (second system).

4th System. The fourth system of ventilation consists in the third system, with the addition of a ventilating stove, with air-chamber, and two wooden extraction-shafts. This is represented by Room No. 3 on the ground-floor, Room No. 12 on the first floor, and Room No. 22 on the second floor.

For the admission of fresh cold air:—Three low gratings, as before; four louvred ventilators, as in the third system.

For the admission of fresh warm air from the air-chamber of the stove:—One louvred ventilator, 2′ 2″ × 7½″.

For the extraction of foul air:—Two high gratings, as before; two wooden extraction shafts 9″ square, with louvred ends.

a. Room No. 3, ground floor:—

Inlet area,—

	Sq. In.
3 low gratings (single)	16
4 louvres (W. O. pattern)	216
1 louvre of stove	65
Total	297

Outlet area,—

	Sq. In.
Two high gratings	24
Two extraction shafts	162
Add chimney	56
Total	242

The number of men intended to occupy the room was 24, and the cubic space, by official return, 13,200 cubic feet, or 550 per man. By actual measurement, with the necessary deductions, it was found to be 13,006, or 542 per man.

	Sq. In.
The inlet area was, on the total number, per man ..	12·4
The outlet area, per man	7·75
Add chimney, per man	2·25
Total outlet..	10·00

Total inlet and outlet area per man, 22·4 square inches, instead of 48.

The actual number of men occupying the room was 18, giving, of cubic space per man, 722 cubic feet.

	Sq. In.
The inlet area per man on the actual number of occupants	16·5
Total outlet area on actual number	13·4
Giving	29·9

total inlet and outlet area, instead of 48.

At 3.40 P.M. on the 3rd instant, seven or eight men had been in the room for about two hours. There was a good fire, and the movement in the chimney was (by Casella's anemometer), 1st experiment, 900 feet (linear) per minute; 2nd ditto, 860 feet; calculated by Montgolfier's formula, 864 feet.

Taken at 900 feet, and area of chimney being ·3927 square feet, this gives a discharge per hour of 21,206 cubic feet.

Carbonic acid, ·668 in 1,000.

Thermometer:—Dry bulb, 59°; wet ditto, 55°. Dew point, 51°·4.

Elastic force of vapour, 0·380.

Vapour in a cubic foot of air, 4·3 grains.

Degree of humidity (saturation 100), 76.

At 11 P.M., 18 men had been in for two hours. Fire out; louvres all open; room rather close; movement in the chimney, 8·528 feet per second (Neumann's anemometer), equal to 12,056 cubic feet per hour.

Extraction shafts working by their louvred ends. When opened, the rate of discharge proved to be nearly 5 feet per second, giving, for the two shafts, a total of 20,448 cubic feet per hour.

Carbonic acid, ·768 in 1,000.

On the 4th instant, at 3.30 P.M., the window louvres were strong inlets, the door louvres were feeble inlets, the stove louvre was a strong inlet,—8·528 feet per second, area ·45 square feet; giving 13,815 cubic feet per hour.

	° F.
Temperature of incoming air	60
Ditto, external air	43
Difference	17

All the openings were inlets, except the extraction shafts and the chimney, which were strong outlets.

At 11 P.M.:—Carbonic acid (in line of door), ·657 in 1,000. Ditto (among the beds), ·698 in 1,000.

Thermometer:—Dry bulb, 55°; wet ditto, 50°. Dew point, 45°·2.

Elastic tension of vapour, 0·302.

Vapour in a cubic foot of air, 3·4 grains.

Degree of humidity (saturation 100), 70.

On the 5th instant, at 0·30 A.M., all the ventilators were open, the fire was out, and the room did not smell very close.

N.B.—In this room there is no urine-tub used, but a patent urinal has been put up, shut off by a door, and lighted by a gas jet all night.

Inlets acting,—

	Cubic Ft.
Stove louvre (feebly) 20 feet per minute, giving, per hour..	540
2 window louvres (feebly)	2,190
3 low gratings	909
2 high ditto	391
Total delivery per hour	4,030

Outlets acting,—

	Cubic Ft.
Chimney	12,056
2 extraction shafts	18,452
2 Window louvres (feeble, same as inlet)	2,190
Total discharge per hour	32,698

This would give, on the total number per man of delivery, 168 cubic feet per hour. Ditto, of discharge, 1,362 feet per hour.

On the actual number of occupants per man of delivery, 224 cubic feet per hour. Ditto, of discharge, 1,817 feet.

At 4.10 A.M., 5th instant, carbonic acid (in line of door), ·805 in 1,000. Ditto (among cots), ·905 in 1,000.

Thermometer:—Dry bulb, 54°·5; wet ditto, 48°·5. Dew point, 42°.6.

Elastic tension of vapour, 0·275.

Vapour in a cubic foot of air, 3 grains.

Degree of humidity (saturation 100), 64.

At 5.10 A.M. there was no very marked smell. The thermometer read:—

Dry bulb, 53°; wet ditto, 49°. Dew point, 45°.

Elastic force of vapour, 0·299.

Vapour in a cubic foot of air, 3·4 grains.

Degree of humidity (saturation 100), 74.

Casella's anemometer was put into one of the extraction-shafts, which was then closed and allowed to work by the louvred end only. At 12.10, noon, it was removed, after seven hours' working, and it showed 37,060 linear feet, or 5,294 in the hour, or 88·23 feet per minute.

Applying the necessary correction of +40 per cent., we have 124·5 feet per minute. With an area of ·568 square feet, this gives 4,248 cubic feet per hour for each shaft, or 8,496 for the two.

The air was tested for organic matter, and ·000005 of permanganate of potash was unaffected by 4 cubic feet. The sediment, which was small in quantity, showed, under the microscope, hairs, wool, sand, amorphous matter, a few scales of epithelium, and some undetermined green substance.

This room, being on the ground-floor, is more favourably situated for ventilation than the following, which are on the first and second floors.

b. Room No. 12 on the first floor:—Arrangements the same as in Room No. 3, except that the low gratings are double, thereby increasing the inlet area by 16 square inches.

Inlet area,—

	Sq. In.
3 low gratings (double)	32
4 louvres (W. O. pattern)	216
1 louvre of stove	65
Total	313

Outlet area,—

	Sq. In.
2 high gratings..	24
2 extraction shafts	162
Add chimney ..	56
Total	242

The number of men intended to occupy the room was 24, and the cubic space, by official return, 13,200 cubic feet, or 550 per man. By actual measurement, with the necessary deductions, it was found to be 12,984, or 541 per man.

The inlet area on the total number per man, was 13 square inches. The total outlet area, 10 square inches. Total inlet and outlet area per man on total number, was 23 square inches, instead of 48.

The actual number of men occupying the room was 13, which increased the cubic space to 999 feet per man.

	Sq. In.
The inlet area per man	24·0
The outlet area per man	18·5
Total	42·5

instead of 48.

On the 4th instant, at 3.30 to 4 P.M., the following inlets were acting:—Louvre of stove, rate 5·576 linear feet per second, delivering, per hour, 9,033 cubic feet of warmed air; two window louvres; one louvre to right of door; and three low gratings.

Outlets acting:—Two extraction shafts; chimney; two high gratings; and one louvre to left of door (variable).

At 11 P.M., 13 men had been in about two hours. Room did not smell very close. Carbonic acid, ·642 in 1,000 volumes.

N.B.—Only one observation could be taken, from want of sufficient apparatus.

Thermometer:—Dry bulb, 53°; wet ditto, 48°. Dew point, 43°.
Elastic force of vapour, 0·277.
Vapour in a cubic foot of air, 3·1 grains.
Degree of humidity (saturation 100), 69.

On the 5th instant, at 1·45 A.M., the delivery of air was as follows:—

	Cubic Ft.
2 door louvres	1,800
3 iron grating	1,660
1 stove louvre	540
Total per hour..	4,000

Discharge of air,—

	Cubic Ft.
2 extraction shafts (2·624 feet per second), open	10,731
2 window louvres (probably same as delivery)	1,800
1 chimney (9·184 feet per second)	12,984
Total per hour	25,515

This would give, on the total number per man of delivery, 167 cubic feet; per man of discharge, 1·063.

On the actual number per man of delivery, 308 cubic feet; per man of discharge, 1,963.

Thermometer:—Dry bulb, 54°·5; wet ditto, 50°. Dew point, 45°·7.
Elastic force of vapour, 0·301.
Vapour in a cubic foot of air, 3·4 grains.
Degree of humidity (saturation 100), 69.
At 4.15 A.M., no unpleasant smell perceptible.
Carbonic acid = ·759 in 1000 vols.
Thermometer :—Dry bulb 53° ; wet ditto 48°. Dew point 43°.
Elastic force of vapour 0·277.
Vapour in a cubic foot of air = 3·1 grains.
Degree of humidity (saturation 100) = 69.

c. Room No. 22, *2nd floor.*—Arrangements the same as in No. 12, cubic space, and inlet and outlet area, the same. The number of men intended to occupy the room was 24, but the number actually occupying it was 22. The cubic space per man was 585 cubic feet.

The inlet area, on the actual number per man, was 14·2 square inches. The total outlet area, per man, on the actual number, was 11 square inches. Total inlet and outlet area 25·2 square inches instead of 48.

On the 4th instant 3 to 4 P.M.

Inlets acting :—2 window louvres, pretty strongly; louvre of stove 4·6 linear feet per second (Neumann's anemometer); delivering 7,452 cubic feet per hour of warmed air.

Outlets acting :—2 door louvres and chimney pretty strongly.

At 11·20 P.M. :—Room rather close, 22 men had been in more than two hours.

Carbonic acid :—·697 in 1,000 vols.

Thermometer :—Dry bulb 51°; wet ditto 47°. Dew point 42°·8.

Elastic force of vapour = 0·276.

Vapour in cubic foot of air = 3·1 grains.

Degree of humidity (saturation 100) = 74.

5th instant, at 2·30 A.M. Room smelt close, all the ventilators, except stove louvre, chimney, and louvres of extraction shafts, had been kept closed in the earlier part of the night. Had them all opened, and delivery and discharge measured.

Delivery of air :—

2 Door louvres	2,385	cubic feet per hour.
3 Low gratings	150	„
Stove louvres (fire out)	Nil	
Total	2,535	„

Discharge of air :—

2 Window louvres (same as delivery)	2,385	cubic feet.
Chimney (4·6 feet per second)	6,624	„
Extraction shafts, no appreciable movement.	..	
Total discharge	9,009	„

This gives on the total number an amount of delivery per man of 106 cubic feet; discharge per man 375 cubic feet; on the actual number 115 cubic feet; delivery per man 409.

At 4.20 A.M. Room very close; very strong smell of urine. The urine tub, four-fifths full, was standing close to the drinking can (!)

Carbonic acid = 1,200 in 1,000 volumes.

N.B.—This appears a large amount compared with the former determination, but we had not the means of making a second observation to check it.

Thermometer :—Dry bulb 53°; wet bulb 49°. Dew point 45°.

Elastic force of vapour = 0·299.

Vapour in a cubic foot of air = 3·4 grains.

Degree of humidity (saturation 100) 74.

General Remarks.

1. In taking the measurements of the rooms, allowance has been made for the men occupying them, and for their bedsteads and bedding, at the following rates :—

For each man	4	cubic feet.
For each bedstead and set of bedding ..	6	„
Total	10	

so that for a room occupied by 24 men, 240 cubic feet would have to be deducted.

2. In estimating inlet and outlet area, the actual area of the apertures at the points of delivery and discharge into and from the room were measured, independent of the size of the external openings; the rate of velocity being measured at the apertures in the internal walls.

3. In measuring louvres, one-third of the gross area was adopted as the net amount on which the calculations were based. It is believed that this would give a tolerably fair result, taking into consideration the obstruction caused by the louvres, and the loss by friction.

4. The direction of the air-currents was observed by burning slow-match paper near the apertures, or by the flame of a candle. The instruments used for determining the velocity of the currents were :—

1. Neumann's anemometer, registering the actual velocity per second.

2. Casella's anemometer, registering the total distance traversed in a given time.

CONCLUSIONS.

From the foregoing experiments the following conclusions may be drawn :

1. The first system of ventilation, common to the whole of the barracks, may be unhesitatingly condemned. The carbonic acid even in the day time, and under favourable circumstances, amounts to more than double the normal amount, whilst at night, when the room has been slept in for some hours, it rises to nearly four times the normal quantity. The arrangements for outlet and inlet area are so inefficient that the rooms may be said to be quite unventilated.

2. The introduction of the Sheringham valves in the second system is a manifest improvement, providing, as it does, a much greater and more regular delivery of air ; but even this plan is essentially faulty in not providing adequate outlet. That the addition of the valve, however, caused an increased interchange of air may be seen by the smaller ratio of carbonic acid in No. 2 room, as compared with No. 10, one of the unventilated rooms.

3. The third system, where the War Office pattern louvres are inserted instead of the Sheringhams, although an improvement on the first system, is inferior to the second. The louvre with a greater area did not deliver so much air as the Sheringham valve. The consequence was that the amount of carbonic acid (in No. 13 Room) was greater than in No. 2 (second system), although less than in No. 10 (first system). In this case also no provision whatever was made for increasing the outlet area.

4. The results proved incontestably that the fourth system was much superior to any of the others. Besides the War Office pattern louvres, the ventilating stove with warm air chamber opening into the room, and two wooden extraction shafts, are provided. Although this is by no means enough, it is so far a step in the right direction, that the carbonic acid in Room No. 3 was, even far in the night, little more than it was in the Room No. 10 (unventilated) in the day time, when there only were two or three men present.

5. The comparative purity of the air in No. 3 Room on the ground floor over that in Room No. 22 in the second floor, and the fact that, while in the former there was a good up-current in the extraction shafts, it was inappreciable in the latter, corroborate what has been already recognized, viz., the increasing difficulty of ventilating rooms in the upper stories of buildings. This will be seen by comparing the rate of movement in the chimneys. In Room No. 3, the rate was about 9 feet per second, in Room No. 22, only 4½ feet per second. Again, in Room No. 3, on the ground floor, the discharge by the shafts was about 18,000 cubic feet per hour. In Room No. 12, first floor, about 9,000 cubic feet. In Room No. 22 nil.

Total discharge in No. 3 was 32,698 cubic feet.
" " No. 12 " 25,515 "
" " No. 22 " 9,009 "

As will be observed from the Table, there is a considerable difference in the rate of discharge if the flap of the extraction shaft be shut, and the air pass out by the louvred ends only. This difference is equal to about 50 per cent.; the amount of carbonic acid in No. 12, first floor, appears to have been rather less than that in No. 3, ground floor, although the interchange of air was manifestly less. This to be accounted for by the fact that there were only 13 men in No. 12, while there were 18 in No. 3. The very considerable increase again in No. 22, second floor, is to be accounted for not only by its position in the upper storey, and the consequent inefficient working of its extraction apparatus, but also by its having 22 men actually sleeping in it.

6. The paramount importance of providing specially for outlet area may be seen by some of the observations, for while (in Room No. 3) 32,000 feet could be definitely measured as being discharged per hour, only about 4,000 feet could be measured as delivered, leaving 28,000 feet, which must have entered, to fill the place of the outgoing air, by the chinks of doors and windows, &c., in short, through apertures not especially provided for purposes of ventilation. In con-

nection with this point the superiority of the ventilating stove over the ordinary grate may be indicated. As may be seen by the Table, in every room with a ventilating stove, there was a good up-draft by the chimney, even far in the night and long after the fire had been extinguished; whilst in the rooms with the old wide grates, no movements could be perceived or detected by instruments even within a very short time after the fire had been raked out.

7. The defects of the barracks may be stated under the following heads:—

a. Original construction. This is faulty in the rooms being built on a wrong plan, the length being too great for the breadth. The external walls, in which are placed the windows and doors, are on the axis of the long diameter, an arrangement which renders efficient ventilation extremely difficult. This difficulty is increased by the doors opening into verandahs which look into the space between the buildings, which is roofed in with glass. Although this roofing is made to open, it is seldom or ever opened, and, as a consequence, the free current of air is impeded.

b. The deficiency of outlet is very marked, even in the best of the rooms (fourth system) it is under one-half of what it ought to be for thorough ventilation.

c. The same may be said of inlet area, although this is of comparatively less consequence; air easily finding its way in, if it can find its way out.

d. There is no special arrangement for the exit of gas products. This not only causes positive contamination of the air but a valuable means of extraction is thereby lost.

e. The ordinary barrack grate with the wide-throated chimney is bad. It consumes a large quantity of coal, gives out very little heat, and when the fire is out there is hardly any up-draught by the chimney. It is not unfrequent for the seven days' supply of coal to run out on the sixth day, while the ordinary ration is more than enough for the ventilating stove, which also warms the room much better.

f. The low gratings are useless as ventilators, but gives rise to unpleasant cold draughts, of which the men complain very much.

g. It may be a question whether the walling off of the non-commissioned officer's bunk is a good arrangement, as it must unquestionably interfere with the ventilation to a certain extent.

h. The use of urine-tubs cannot be too strongly condemned; there ought to be a patent urinal, well ventilated and lighted at night (as in Room No. 3) in every barrack room.

8. The following suggestions for improvement may be made:—

a. Considering the original faulty construction of the rooms, the average of 600 cubic feet per man is hardly enough. It would therefore be advisable to diminish the number to, say 16, instead of 24, so that at least 800 cubic feet per man might be provided. At the same time the glass roofing over the space between the buildings ought to be removed, as the slight protection it affords from the weather hardly compensates for the obstruction it offers to ventilation.

b. The outlet area ought to be increased so as to afford at least 24 square inches per man. To effect this in a room with 16 men, four nine-inch extraction shafts might be placed at the corners, and another over the gas lamp. This would give 400 square inches or 25 per man, independent of the chimney. Objections have been made to the extraction shafts as increasing the danger of fire, from their being made of wood, but they might equally well be made of iron or some other incombustible material.

c. The inlet area ought to be increased. This might be done by the insertion of six Sheringham valves, which, with the louvre of a ventilating stove, would give 365 square inches, or for 16 men, about 23 square inches a head. This, with the doors and windows, would probably be sufficient.

d. A shaft as an outlet for the gas products, has already been recommended in paragraph *b.*

e. The old grates ought to be exchanged for the ventilating stove, and for the following reasons:—

1. It provides additional inlet area, and a constant delivery of warm fresh air as long as the fire is burning.

2. Even after the fire is out there is a good up-draught by the chimney.

th

ER. 30 A.M.			
	Vapour in a Cubic Foot of Air.	Degree of Humidity.	Dry Bulb.
ns. er- y.	Grains	Saturation 100.	Deg Fah
	..	..	36
207	2·4	84	37
364	4·05	66	61
·4 391	4·4	87	5
·6 310	3·5	74	
·4	..	..	5
·5 301	3·4	69	
1	..	..	

3. It warms the room better and with a smaller expenditure of coal than the ordinary grate. This the men occupying the rooms readily admitted.

f. The old gratings near the floor, which only create unpleasant draughts, ought to be permanently closed.

g. As before mentioned, patent urinals ought to be substituted for urine-tubs in all barrack rooms.

h. Where the ventilating stove is not supplied, a little fire left burning in the grate would materially assist the extraction of foul air by the chimney.

Lastly. All ventilators should be so arranged as to be entirely beyond the control of the soldier himself, and should be closed only by the non-commissioned officer, and that only in decidedly cold weather, and where a distinct draught is perceived.

SANITARY REPORT OF THE ROYAL VICTORIA HOSPITAL, NETLEY.

(For the Year ending December 31st, 1863.)

Submitted by Inspector-General Anderson, M.D.

Since the 11th March, 1863, the date of its opening, to December 31st, 1863, 3,567 patients have been admitted into the Royal Victoria Hospital.

With the exception of cases of primary syphilis sent from Portsmouth for the purposes of clinical instruction, and the few sick of the Army Hospital Corps, the admissions have been those of invalids from India and the colonies, and latterly of a small number from home stations.

The hospital consists of three divisions: a Convalescent division on the first floor, a Medical on the second, and a Surgical on the third floor.

The Convalescent Division comprises all men who would formerly have been quartered at St. Mary's, viz., those of twenty-one years' service, those who have recovered their health on board ship, and those who have passed through, or are waiting to pass through, the Medical or Surgical Divisions. A few invalids have been transferred from home stations to Netley for the purpose of affording clinical instruction during the winter session of the Army Medical School, as at this season there are very few arrivals from the colonies.

The chief diseases treated have been cases of phthisis pulmonalis, dysentery, hepatitis, and secondary syphilis. Of the latter the admissions have been numerous.

Of the influence of the climate on medical cases, and upon the healing of sores, my short experience of this station, and the peculiar class of patients treated, do not enable me to speak definitely, but no disease of local origin, such as intermittent fever, has presented itself amongst the residents.

Aware as I am of the objections that have been raised to the hospital and its site, I shall, in a few words, give the result of my eight months' observation and experience; and first, as to the difficulty that was anticipated in the landing of invalids; this, I am glad to say, has not been found to exist, as only on two occasions, where the men were transferred to Netley from Spithead, and put ashore at dead low water, has there been any inconvenience. At all other times the sick have been comfortably landed, having been transhipped from the steamer (in which they were brought round from Spithead) into the large boats of Her Majesty's ship "Dauntless," and disembarked at the Queen's Stairs, whence they have been moved in stretchers if unable to walk, or marched up, if in tolerable health, to the hospital.

When the proposed pier has been erected, boats will be able to land at it at all states of the tide.

With regard to the large tract of mud left dry at low water, and its alleged poisonous emanations, I must honestly confess that only occasionally have I been able to detect the slightest effluvia, and this was confined to one particular spot near the contractor's works on the beach. At a few yards off, even this was imperceptible; so that it could not possibly have any deleterious influence upon the health of the inmates of the hospital.

Owing to the peculiarity of the tidal flow in the Southampton Water, the mud is not uncovered for the same space of time as it would be were it any other locality, two hours after high water the tide beginning partially again to flow. I have inhabited a house situated as close to the banks of the estuary as the hospital is, and I can emphatically declare that at no time, either day or night, have I been sensible of any bad odour arising from the mud.

The grounds attached are being gradually levelled, and the esplanades in front of the north and south wings have been thoroughly drained and covered with gravel, got from a pit about one hundred yards from the hospital. Some time must elapse before the terraces near the Southampton Water can be laid out, owing to the non-removal of the very unsightly works of the contractor, and of the hideous piles of (in many cases) crumbling bricks, which appear to have been left there owing to their unfitness for building purposes.

The cottages for the families of the married invalids and for the married sergeants and orderlies are situated on the highest part of the ground, in the space which has neither the hospital nor the officers' quarters in front of it. They are in five parallel rows; each row is divided into two blocks, which consist of eight ground cottages. They appear to be well constructed, and will be ventilated by cross windows, perforated bricks, and louvres. Attached will be a large wash-house and other offices. As yet they are in an unfinished state, and will not be fit for habitation, at the earliest, before the 1st of April. I am unaware as to the extent of ground set apart for these houses; but if there were no limit to the space, I think it is to be regretted that, on sanitary grounds, they had not been built *en échelon*, as should the winds blow directly on the front row, but little will reach that in the rear, and *vice versâ*. When these cottages are inhabited, the contractor's huts behind the hospital ought to be at once removed, and their immediate vicinity cleared, as besides preventing the free circulation of air, they are, on other grounds, very objectionable.

The corridors of the hospital have afforded the patients, in bad weather, opportunities of exercise which would have been denied them had those spacious and lofty passages not been in existence. I am not prepared to defend the corridor system in this or in any other hospital; but I would, with the utmost deference, submit that with the peculiar class of patients (so few being bed-ridden, and there being, I may say, no cases of fever or other infectious diseases) no grave objection to it can exist. The construction of the corridor ought also to be taken into consideration. The side of it opposite the doors of the wards is composed of large glass windows opening easily, and admitting a free communication with the external air. When these are shut in bad weather, the corridors are ventilated by fire-places, by, in each window, Moore's glass louvres, and by a perforated plate above each gaselier, covering the orifice of a foul-air shaft, which runs inwards and upwards by the side of the chimney, and open at the top of the hospital.

Of the ventilation of the wards I beg to subjoin some notes furnished to me by Professor Parkes:—

"The ventilation of the hospital is provided for by doors and windows, and by special openings. Each ward is separately ventilated, and there is no general artificial system.

"The air of the corridor is, for the most part, very pure. Occasionally an odour, arising in some part of the hospital, may be traced for some way along the corridor, showing that great care is necessary to prevent the transference of foul air through the corridor from one spot to another.

"The air in the corridor was analysed last summer by Dr. Innes (16th Lancers), and by Messrs. Venning and Martin (at that time Candidates), and the amount of carbonic acid was found to be five parts per 1,000 volumes, the air outside at the same time giving an amount a little over four volumes of carbonic acid. The amount of organic matter in the corridor air was scarcely greater than that of the outside air. This shows a very fair condition of the corridor atmosphere.

" *Wards.*—The ventilation is the same in principle in all the wards, but as the wards are of different sizes, there are slight differences of detail.

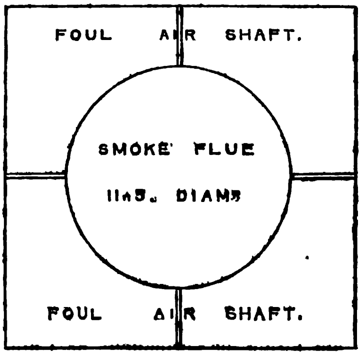
" *Wards for* 9 *Men.*—Fresh air is admitted by windows placed at the two ends of the wards, those opening into the corridor being fan windows, those at the other or north-east end being double. The distance between the windows is 36 feet.

" The special openings *for the admission of fresh air* are—

" (*a*) Two Sheringham valves in the north-east wall, 13 feet from the ground; effective opening of each valve, 54 square inches, or for the ward, 108 square inches. (*b*) Hot-air shaft running up from behind fire; effective area, 54 square inches.

" The openings for *the discharge of foul air* are—

" (*a*) The chimney has an area of throat equal to 54 square inches. (*b*) Commencing over the gas, so as to carry off the products of combustion, and then running horizontally to the chimney, and then upwards round the smoke-flue, is a foul-air shaft, the area of which is almost 100 square inches.



" On the ground floor the foul-air shafts have a height of 55·75 feet from the ceiling to the opening above; on the first floor of 39 feet; on the top floor of 24 feet. They open by square openings on the face of the chimney, and about 1¼ feet below.

" *Wards for* 12 *and* 14 *Men.*—The arrangements are the same as in the smaller wards, except that there are two fire-places, and in some of the wards Moore's glass louvres are fixed in the windows.

" Total section area of openings for each man, independent of doors and windows:—

	Inlet.	Outlet.	Total.
	sq. inch.	sq. inch.	sq. inch.
In the 9-Men Wards	18	17·15	35·15
In the 12-Men Wards..	18	19·6	37·6
In the 14-Men Wards	15·43	16·78	32·21

" All the wards require and receive very great attention to keep the air sweet.

" Last summer the gentlemen already alluded to, Dr. Innes (16th Lancers) and Messrs. Venning and Martin, spent two nights in one of the 9-men wards examining the air when the windows and doors were closed. The discharge of air per man per hour was found to average about 1,100 to 1,200 cubic feet through the chimney and foul-air shaft conjointly. The amount of carbonic acid increased to double that in the outside air, and the amount of organic matter was also more than doubled. On both nights, however, the air was warm and still, and the change was less and the impurity more than would be the case in colder weather, and with a brisker movement. During the last winter (1863-64), owing to the anemometers being out of order, no experiments have yet been made.

"Generally the direction of movement is as contemplated by the designer of the ventilation; but occasionally, in a south-west wind, the air blows down the foul-air shaft, the openings in which at the top are not protected. The movement through the Sheringham valves is often, and indeed generally, extremely feeble, and it may be suggested whether it might not be well to remove the wire gauze which covers the top."

"Although, even under unfavourable conditions, there was a considerable movement of air in the wards through the outlet tubes, and although the cubic space per head is large, there is no doubt that almost constant opening of the windows is necessary at all times of the year, and it is a very essential point that these wards should never be overcrowded. Under no circumstances should more beds be placed in them than at present, nor should any be placed in the corridor. If this caution be neglected at any future time, some bad consequences must ensue.

"*Closets and Bath-rooms.*—Fresh air is admitted by Moore's glass louvres, and by a perforated air brick; foul air is discharged by two nine-inch pipes running up near the chimney; but quite distinct from the foul-air shaft of the wards.

"*Orderlies' Rooms in the Corridor.*—There is a fire-place in each room, and in addition, a square foul-air shaft surrounds the circular smoke-flue."

The parian cement with which the walls are covered in a sanitary point of view may be advisable, more particularly in a fever hospital; but I cannot say that its appearance is prepossessing, and in the lobbies and staircases I think that, under present circumstances, it is objectionable, as in wet or damp weather the condensation of moisture is so great that the walls are covered with water, which streams down from them, and forms pools at the foot. To dry these walls there is required either an additional number of attendants or an improved method of warming, by placing large stoves at the bottom of each staircase and keeping them lit night and day in winter. The dingy hue of the parian cement exhibiting in a dark colour the shape of the bricks behind, will, I am afraid, be permanent, as I am unable to observe any improvement in the colour of the walls of those wards which have been in constant occupation.

Of the officers' quarters I cannot speak so favourably as I have been able to do of the hospital; they are undeniably damp, and the state of health of the inmates has, I think, proved this, as rheumatism and acute bronchitic attacks (in some cases severe), and a tendency to intermittent fever in those who have formerly suffered from it, have been pretty frequent. The single rooms of the junior officers are badly ventilated; a large space in each, having no opening, but forming a sort of cul-de-sac, is, I presume, intended for sleeping accommodation. Their kitchens and servants' rooms are likewise insufficient, but it is in contemplation to improve both.

The following observations have been made by Dr. McCully, Medical Candidate, on an examination of the air in a ward of the Royal Victoria Hospital, and though his experiments are of a later date, still as illustrating the subject of the ventilation of the hospital, I think it well to introduce them.

REPORT BY DR. M'CULLY.

"The annexed Table gives the results of an experiment which I performed in No. 28 Ward, Medical Division, on the night of 16th December, 1864; my object being to ascertain—

"1. The amount of Co_2 per 1,000 volumes.

"2. The amount of foul air passing out of chimneys.

"3. The suspended organic matter both by permanganate of potash solution and by the areoscope.

"4. The hygrometric conditions of the air in ward as compared with the external air.

"The amount of carbonic acid was determined by Pettenkoffer's test. The foul air was determined by Neumann's anemometer in the chimneys only, as the foul-air shaft over the gas could not be reached. I, however, repeatedly tried it by means of velvet smoke, and found that it acted as an outlet.

"To discover whatever organic impurities might be suspended in the air of the ward, sixteen cubic feet of air were drawn through a solution of permanganate of potash of known strength (1 cc = 00002 grammes of permanganate of potash), which completely decolorised 2 cc of the permanganate of potash solution or 0·00004 grammes. Also four cubic feet of air were drawn through an areoscope, on to a piece of thin glass containing a drop of glycerine, which, when placed under the microscope, clearly showed casts of epithelium and fibres of cotton and wool, &c.

"The hygrometric conditions of the air were calculated from Mr. Glaisher's Tables. The Co_2 was decidedly in excess. This I attribute to the fact of there being three assistants and myself in the ward during each experiment, which would naturally increase the amount of Co_2. The highest amount was at two A.M., viz., 1·142, and the lowest at ten P.M., ·847. The anemometer gave remarkably good results, considering that the amount was from the chimneys alone. The highest amount per man per hour was 1,170 cubic feet, and the lowest = 830 cubic feet.

"A glance at the Table will show that in one or two instances, when the Co_2 was high, the discharge of air decreased. With regard to the suspended organic matter, all I can state is, that in sixteen cubic feet of air enough existed to destroy ·00004 grammes of permanganate of potash. The thermometric results were satisfactory, showing that during the whole night a difference of from nineteen to twenty-two degrees was maintained between the external and internal temperature."

Hourly Examination of the Air during the Night of December 16, 1864, in No. 28 Ward, A Block, Medical Division, at Royal Victoria Hospital.

By Dr. McCully (Medical Candidate).

Hour.	Cubic Space.			Discharge by Neumann's Anemometer in Cubic Feet per Hour.				Carbonic Acid in 1,000 Volumes.	Hygrometric Observations.																		Difference between the Internal and External Humidity.	Wind, N.E.	Minimum Temperature during the Night.	Remarks.
									Internal.									External.												
	Total Cubic Space after all deductions, &c.	Number of Men in Ward.	Cubic Space per Man.	Right Chimney.	Left Chimney.	Total Amount in both.	Cubic feet of Air discharged per Man per Hour through Chimneys alone.		Barometer.	Dry Bulb.	Wet Bulb.	Dew Point.	Elastic Force of Vapour.	Vapour in a Cubic Foot of Air.	Amount required to saturate a Cubic Foot of Air.	Relative Humidity.	Weight of a Cubic Foot of Air.	Barometer.	Dry Bulb.	Wet Bulb.	Dew Point.	Elastic Force of Vapour.	Vapour in a Cubic Foot of Air.	Vapour required to saturate a Cubic Foot of Air.	Relative Humidity.	Weight of a Cubic Foot of Air.		Velocity during the Hour.		
P.M. 9	26,081	14	1,863	10,075	6,395	16,470	1,176	·924	29·820	50·5	45·0	39·2	·240	2·75	1·4	65·5	541·5	29·820	33·0	32·0	30·0	·167	2·0	·2	89	561·2	245	6·65	33·5	Good fire in both fire-places.
10	,,	,,	,,	8,482	5,665	14,147	1,010	·847	29·820	50·0	45·0	39·7	·245	2·80	1·3	68	542	29·820	33·0	32·0	30·0	·167	2·0	·2	89	561·2	21	10·17	,,	
11	,,	,,	,,	7,081	5,665	12,746	910	·922	29·830	50·0	46·0	41·8	·265	3·00	1·1	74	542	29·820	32·0	31·4	30·0	·167	2·0	·1	92	562	18	16·14	,,	Good fire; smell perceptible.
12	,,	,,	,,	7,090	7,080	14,170	1,012	·989	29·830	51·0	46·0	40·8	·255	2·90	1·3	68	541	29·820	31·8	31·0	29·1	·161	2·0	·16	90	562·6	22	8·92	,,	
A.M. 1	,,	,,	,,	7,081	5,665	12,476	910	1·044	29·840	50·0	45·0	39·7	·245	2·80	1·3	68	543	29·820	31·5	31·0	29·8	·166	2·0	·10	93	562·8	25	4·74	,,	Good fire; smell more perceptible.
2	,,	,,	,,	7,848	6,120	13,968	997	1·142	29·830	50·0	45·5	40·7	·255	2·9	1·2	71	542	29·820	29·5	29·0	27·5	·150	1·8	·15	92	565·2	21	3·49	,,	Low fire.
	,,	,,	,,	6,503	5,112	11,615	830	1·123	29·830	50·0	45·5	40·7	·255	2·9	1·2	71	542	29·820	29·0	28·4	26·2	·142	1·7	·20	89	565	18	4·68	,,	
4	,,	,,	,,	7,090	5,707	12,797	913	1·123	29·830	50·0	46·0	41·8	·265	3·00	1·1	74	542	29·820	28·5	27·4	23·2	·126	1·5	·35	80	566·5	6	5·72	,,	
5	,,	,,	,,	7,416	7,893	15,309	1,100	1·000	29·830	50·0	47·0	43·8	·286	3·300	·8	80	542	29·820	28·0	27·4	24·9	·134	1·6	·20	87	567	7	5·94	,,	Good fire in left chimney.
6	,,	,,	,,	7,893	5,112	13,005	928	·984	29·830	50·0	46·5	42·8	·275	3·100	1·0	77	542·2	29·820	28·	27·4	24·9	·134	1·6	·20	87	567	10	2·10	,,	
7	,,	,,	,,	7,081	7,200	14,281	1,020	1·000	29·830	52·0	48·0	43·9	·287	3·3	1·1	74	539·6	29·820	28·5	28·0	26·2	·141	1·6	·15	91	566·4	17	6·00	,,	

Means of Ventilation:—5 windows; 4 fly windows; 2 glass doors with fly windows at top; 2 Sheringham valves; 2 hot air shafts; 3 foul air shafts; 4 gas jets; 2 fire-places.

Suspended Matter in the Air of No. 28 Ward, as seen through the Microscope.

Deposit after drawing 16 cubic feet of air through a solution of permanganate of potash:—Cotton fibres; Epithelium; Matter of uncertain origin.

Deposit after drawing 4 cubic feet of air through an areoscope on glycerine:—Cotton fibres; Wool; Epithelium; Dust or Ashes.

TABLE OF THE NUTRITIVE VALUE OF HOSPITAL DIETS AS ISSUED ACCORDING TO REGULATIONS IN MILITARY HOSPITALS.

By Assistant-Surgeon De Chaumont, M.D.

Tea Diet.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free).	Water.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Bread	8	0·640	0·120	3·936	0·104	4·800	3·200
Tea	½	..	..	..	..	..	..
Sugar	2½	..	..	2·412	0·013	2·450	0·075
Milk..	6	0·240	0·222	0·300	0·036	0·798	5·202
Total	17	0·880	0·342	6·348	0·153	8·023	8·477

Spoon Diet.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free).	Water.
Bread	8	0·640	0·120	3·936	0·104	4·800	3·200
Tea	¼	..	..	..	..	..	..
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	0·240	0·222	0·300	·036	·798	5·202
Also { Arrowroot	2	0·080	..	1·640	·020	1·740	·260
Also { Sugar	1	..	..	·965	·005	·970	·030
Total	18¾	0·960	0·342	8·288	0·173	9·763	8·737

Milk Diet.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free).	Water.
Bread	14	1·120	0·210	6·888	·182	8·400	5·600
Rice..	2	·100	0·016	1·664	·010	1·790	·200
Milk..	60	2·400	2·220	3·000	·360	7·980	52·020
Sugar	1	..	..	·965	·005	·970	·030
Total	77	3·620	2·446	12·517	·557	19·140	57·850

Beef Tea Diet.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free).	Water.
Bread	12	·960	·180	5·904	·156	7·200	4·800
Tea	¼	..	..	..	..	..	..
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	·240	·222	0·300	·036	·798	5·202
Beef..	8	1·200	·672	..	·128	2·000	6·000
Salt	½	..	..	..	·500	·500	..
Total	28¼	2·400	1·074	7·651	·828	11·953	16·047

Low Diet.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free).	Water.
Meat (without Bone) ..	8	1·200	·672	..	·128	2·000	6·000
Bread	14	1·120	·210	6·888	·182	8·400	5·600
Butter	1	·003	·910	..	·027	·940	·060
Sugar	1½	..	..	..	·008	1·455	·04
Tea	¼	..	..	1·447	..	..	..5
Milk..	6	·240	·220	..	·036	·798	5·202
Pudding { Rice	2	·100	·016	·300	·010	1·800	·200
Pudding { Milk	15	·600	·555	1·664	·090	1·995	13·005
Pudding { Sugar	½	..	..	·750	·003	·485	·015
Pudding { Egg { No. 1 = 2 ozs. less 10 per cent. for Shell. }	1⅘	·240	·209	·482	·020	·472	1·323
Salt	½	..	..	..	·500	·500	..
Total	49 11/20	3·503	2·792	11·531	1·004	18·845	31·450

HALF DIET.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free.)	Water.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Meat (without Bone) ..	8	1·200	·672	..	·128	2·000	6·000
Bread	16	1·280	·240	7·872	·208	9·600	6·400
Potatoes	8	·120	·008	1·872	·080	2·080	5·920
Barley	1½	·185	·027	1·071	·037	1·320	·045
Flour	¼	·036	·003	·172	·004	·215	·035
Vegetables	4	·008	·020	·232	·028	·288	3·640
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	·240	·222	300	·036	·798	5·202
Butter	1	·003	·910	..	·027	·940	·060
Salt	¾	..	..	..	·750	·750	..
Tea	¼	..	..	..	..	..	..
Total	47¾	3·072	2·102	12·966	1·306	19·446	27·607

ROAST HALF DIET.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free.)	Water.
Meat (without Bone) ..	8	1·200	·672	..	·128	2·000	6·000
Bread	18	1·440	·270	8·856	·234	10·800	7·200
Potatoes	8	·120	·008	1·872	·080	2·080	5·920
Vegetables	4	·008	·020	·232	·028	·288	3·640
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	·240	·222	·300	·036	·789	5·202
Butter	1	·003	·910	..	·027	·940	·060
Salt	¾	..	..	..	·750	·750	..
Tea	¼	..	..	..	..	..	..
Total	46½	3·011	2·102	12·707	1·291	19·111	28·067

ENTIRE DIET.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free.)	Water.
Meat (without Bone) ..	12	1·800	1·008	..	·192	3·000	9·000
Bread	16	1·280	·240	7·872	·208	9·600	6·400
Potatoes	16	·240	·016	3·744	·160	4·160	11·840
Barley	1½	·185	·037	1·071	·037	1·320	·045
Flour	¼	·036	·003	·172	·004	·215	·035
Vegetables	4	·008	·020	·232	·028	·288	3·640
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	·240	·222	·300	·036	·790	5·202
Butter	1	·003	·910	..	·027	·940	·060
Salt	¾	..	..	..	·750	·750	..
Tea	¼	..	..	..	..	..	..
Total	59¼	3·792	2·446	14·838	1·450	22·526	36·267

VARIED DIET.

Articles.	Total Weight.	Albuminates.	Fat.	Carbo-Hydrat.	Salts.	Total Weight (Water Free.)	Water.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Meat (without Bone) ..	12	1·800	1·008	..	·192	3·000	6·000
Bread	18	1·440	·270	8·856	·234	10·800	7·200
Vegetables	4	·008	·020	·232	·028	·288	3·640
Potatoes	16	·240	·016	3·744	·160	4·160	11·840
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	·240	·222	·300	·036	·798	5·202
Butter	1	·003	·910	..	·027	·940	·060
Salt	¾	..	..	..	·750	·750	..
Tea	¼	..	..	..	..	..	..
Total	59½	3·731	2·446	14·579	1·435	22·191	33·987

CHICKEN DIET.

Fowl	8	1·728	·152	..	·224	2·104	5·896
Bread	18	1·440	·270	8·856	·234	10·800	7·200
Sugar	1½	..	..	1·447	·008	1·455	·045
Milk..	6	·240	·222	·300	·036	·798	5·202
Butter	1	·003	·910	..	·027	·940	·060
Salt	¾	..	..	..	·750	·750	..
Tea	¼	..	..	..	..	..	..
Total	35½	3·411	1·554	10·603	1·279	16·847	18·403

FISH DIET.

White Fish..	8	1·328	·064	..	·232	1·624	6·376
Bread	18	1·440	·270	8·856	·234	10·800	7·200
Potatoes	8	·120	·008	1·872	·080	2·080	5·920
Sugar	1½	..	..	1·447	·008	1·455	0·045
Milk..	6	·240	·222	·300	·036	·798	5·202
Butter	2	·006	1·820	..	·054	1·880	0·120
Salt	¾	..	..	..	·750	·750	..
Tea	¼	..	..	..	..	..	..
Total	44½	3·134	2·384	12·475	1·394	19·387	24·863

The estimates for beef tea and low diets are probably too high, as part of the fibrin is not used, the soup only being given.

Where the constituents of an article do not make up the *exact* quantity of the gross weight, it is to be understood that the complement is *non-assimilable*, and therefore not to be included in estimating the *nutritive* value of the article.

To get out the *nitrogen* in *grains*, multiply the weight in ounces of the albuminates by 69·4.

Under certain circumstances laid down in the Medical Regulations, the following extra articles are allowed to be issued, supplementary to the diets, viz., arrowroot, sago, tea, sugar, bread, essence of beef, spirits, wine, malt iquor, jelly, milk, eggs, oranges or other inexpensive fruit.

GENERAL OBSERVATIONS ON THE CLOTHING, RATIONS, AND COOKING, GYMNASTIC INSTRUCTION, AND OTHER POINTS CONNECTED WITH THE SANITARY ECONOMY OF THE TROOPS.

The clothing of the troops has been little changed as to either textures or pattern, but the comfort and health of the men has been well considered in certain recent regulations on the subject and, essentially, as regards the question of the under-clothing.

A War Office Circular has very lately been issued, detailing the articles to comprize the soldier's ordinary kit; and it is specified that the man may be supplied either with three cotton or two flannel shirts. By this arrangement the sanitary measure, so long and very universally advocated by Medical Officers, has been sanctioned, to the practical end that the flannel shirt may be the article of general wear wherever the nature of service or character of climate render it advisable; while, otherwise, the soldier can suit whatever preference he may have from personal feeling. This sanitary policy would appear to have been anticipated, in a few instances, by regimental arrangement; and in one Infantry corps, on the Home Service, it is reported that the use of flannel for under-clothing had already been introduced, and the article worn by numbers of the men more and more up to the amount that 545 vestments of the kind had been issued in course of the year 1863, at the close of which 325 men were actually wearing them.

The new clothing circular leaves nothing to indecision or uncertain supply on the occasion of a regiment called upon to proceed on active service. It lays down specific rules for supply of articles for the field, in cold, temperate and tropical climates, and as follows:—

Upon a regiment receiving orders to take part in active operations of war, extra clothing for the men is to be granted, in the following proportion for every 100 present and effective, according as the destination may be to cold, temperate, or tropical climates; and the articles are to be provided at the expense of the public, although not to be understood as matters of right of property by the wearers.

1. In cold climates:—

Sheep-skin Coats		8
Fur Caps		100
Woollen Comforters		100
Shirts, Grey Flannel		200
Jerseys, Blue		100
Boots, Knee, Brown Leather	pairs	100
Stockings, Woollen	„	200
Drawers, Flannel	„	200
Cholera Belts, Flannel	„	200
Mittens, lined with lambskin or fur	„	100

In addition to the above, mounted troops are to be supplied with a "pilot," or rough-weather, coat for each man present and effective in the field.

2. In temperate climates:—

Shirts, Flannel, of a light texture	200
Cholera Belts, when not included in the Voyage Kit	200
Waterproof Capes	10
Watch Coats	3

3. In tropical climates:—

Shirts, Flannel, of lightest texture	200
Chaco Covers, of white cotton (except in climates where the Wicker Helmet and "Puggaree" (turban) are to be worn)	100
Forage Cap Covers, of white Cotton	100
Frock Coats of red, green, or blue Serge, when not supplied as ordinary Clothing of these climates	100
Cholera Belts, of Flannel, when not part of the Sea Kit	200
Capes, Waterproof	10

Requisitions for the foregoing articles, according to the specific service indicated, are to be addressed, through the Adjutant-General of the Forces, to the Minister for War with the least possible delay, after Commanding Officers have received instructions to hold their regiments in readiness for active service in the field.

The established light clothing for wear in the tropical and semi-tropical stations of the Army continues to meet with express approval, through the observations and in the opinion of Medical Officers. An appropriate head-dress for certain of the stations, however, had remained a desideratum; but it has now been ordered, 1st, that regiments serving in China, Ceylon, and Mauritius, are to wear wicker helmets with "puggarees," much similar to those worn by the troops in India; and 2ndly, corps serving at the Cape, St. Helena, in the Mediterranean, and West Indies, to use the ordinary chaco with a white cotton cover.

In the sanitary reports allusion is made to a great improvement effected lately in the cloak worn by the Royal Artillery,—that of having the cape made removeable and thus rendered useful for many occasions of wear by itself.

The new pattern great coat for the Infantry is found to afford increased comfort by its greater convenience of fit, and in forming, with its appendages of lappets and deep rolling collar, a better protection to the shoulders and neck.

The watch-coat for sentry duty has been most valuable in the winter-months; but, as this extra article of protection is transferred to the relieving man on each post, it would be advantageous that a set of oil-cloth or tarpaulin capes, such as are worn by the Metropolitan Police force, should be furnished, in relative proportion, for every guard whose rounds of posts are extensive; for, in going the round of the reliefs, the men often find their great coats rendered so drenched with rain that they do not become thoroughly dried again, possibly for days, meanwhile, that they cause the atmosphere of the guard-room to be impure by evaporation and prejudicial to the health of the occupants.

The experience obtained in the gymnastic training of the recruits at St. John's Wood Barrack has urged the Medical Officers of the Guards strongly to represent the necessity for the use of flannel vestments at these drills and exercises. It is reported that serious occurrences of catarrh, rheumatism, and pulmonary affections have taken place among the young soldiers of the brigade through the circumstance of their encountering sudden chills on the cessation of their exertions in the gymnasium, and on account of wearing cotton shirts only. This, a vital question, having been referred by the Field-Marshal Commanding-in-Chief to the Director-General, Sir James Gibson, K.C.B., recently took the opportunity to advise that a flannel or light serge jacket, similar to that of the suit furnished for the instructors, should be provided for every man during his appointed course of training,—an essential protection against a risk of disease.

Another point in connection with the clothing appointments may be adverted to. The leather gaiter of the Infantry, so useful in wet weather and muddy ways, has been reported by Medical Officers as tending often to create a chafing by over-riding the back of the ankle-boot; and it is suggested that the addition of an under-strap to the gaiter would prevent this result. Ordinarily, the question may seem to present no very great prominence, but it might, nevertheless, very considerably bear upon the continued efficiency of a regiment on service and if only in a subsidiary degree to good boots,—the first and last necessity of the campaigning soldier.

BARRACK ACCOMMODATION.

The authorities have had under deliberation, from time to time, the condition and extent of the barrack accommodation in various parts of England; and, on the recommendation of the Field-Marshal Commanding-in-Chief, re-appropriations so as to give 600 cubic feet per man, in accordance with the new regulations, have been sanctioned for the following stations:—Canterbury, Walmer, Maidstone, Dover, Brighton, Parkhurst and forts in the Isle of Wight, Winchester, the forts and defences connected with the harbour of Portsmouth, Devonport and Plymouth, the Channel Islands, Aldershot, Pembroke defensible barracks and neighbouring forts, Sheerness, Warley, Colchester, the several barracks occupied by the Guards in London, Weedon and Northampton, Birmingham and Coventry, Newcastle and Carlisle, and at several of the minor and out-stations of the Manchester district. The barracks of Chatham have hitherto most required re-appropriation, but the strength of the garrison has only admitted of 580 cubic feet being allotted as yet.

In Scotland the regulated 600 cubic feet have been decided on as a re-appropriation of the barracks at Ayr, Perth, Hamilton, Aberdeen, Glasgow, and Paisley.

In Ireland similar allotment is being carried out for the barracks at Athlone, Belfast, Buttevant, and Fermoy—leading stations for the most part occupied by depôt battalions, constituted principally of recruits and young soldiers, with proportions of service-worn men from tropical climates. The measure of re-appropriation has, further, been approved to be brought into effect at a number of the minor military establishments throughout the several districts of this country.

While all new barracks have, as a matter of course, been estimated for in the full complement of cubical accommodation per man established by modern regulation, the progress shown by the foregoing detail, in equalizing so many of the old ones to the new standard rate of occupation, is very satisfactory.

VENTILATION AND WARMING OF BARRACKS.

Ventilation.—In the South-Western District, questions as to the state of ventilation in some barracks having come under the consideration of the Principal Medical Officer, an interesting set of experiments was made, at his request, by Mr. Perry, Surgeon of the Royal Artillery; and the report, as regards certain quarters occupied by the men of the batteries under Mr. Perry's charge, may be here given.

"*Royal Artillery Hospital, March* 30, 1863.

"The Barracks in question are those of the Gun Wharf, Southsea Castle, and Lump's Fort. With the exception of the last-named one, which is warmed by means of two large iron stoves having open grates and metallic chimneys, these barracks are filled with the new ventilating fire-places and also with the system of ventilation recommended by the Sanitary Commissioners. The means taken to determine the efficiency of the ventilation have been by visiting the rooms when the men had been some hours in quarters, and to choose those which were most fully occupied. Precautions also were taken to prevent the doors and windows having been opened for some hours previous to the various inspections that were made. It was found upon these occasions that upon entering the rooms (clear nights having been chosen for the purpose) that there was in all of them an absence of fœtor in their atmosphere, the only odour present being that which is always found to exist where a large quantity of woollen clothing is stored. At the Gun Wharf Barracks, Portsmouth, a room upon the middle floor was selected, midnight being the hour of inspection, and the atmosphere clear and very calm. This room (No. 3) was occupied by 23 men, but is constructed to accommodate 28; measured to a height of 12 feet from the floor, each man had 574 cubic feet of air. The thermometer stood at 62° Fahr. inside the room and 50° in the open air. The room has only one fire-place, and the fire was extinguished. The barometer indicated a pressure equal to 30·5 inches. No fœtid odour was distinguishable. On applying Nessler's test for alkalinity in the air, ammonia was proved to be present, the solution giving an appreciable quantity of the characteristic precipitate Hg.$_4$ N.I. 2 H.O.

"At Southsea Castle, No. 3 Room, in the keep, a low and casemated apartment constructed for 18 men but occupied by 16, giving to the latter number a cubic space of 356 feet per man, was selected for experiment. The hour was 12 P.M., the night clear with a fresh westerly breeze blowing. The thermometer stood at 59° Fahr. inside, 49° in the open air. The barometer marked 30 inches. The ventilators were all in action, as proved by the direction of the candle's flame. There was a small fire burning in the grate, and there was an absence of all foul odour in the room, the smell of clothing being alone apparent. Nessler's test gave a less quantity of ammonia in the air of this room than in the one at the Gun Wharf Barracks, although there was so much less cubic space available for each individual, and an urine-tub was discovered to have been introduced into the room. This result might, however, be accounted for from two reasons, the first being that the Gun Wharf Barrack is situated in the town, and the one in question is very far removed from any source of aerial contamination: the second reason being that at the time of experiment the external air was moving with considerable velocity.

"At Lump's Fort (inspected upon the same night as Southsea Castle) there is but one barrack-room, but it is constructed to give accommodation to 40 men and, according to the measurement of the barrack department, each occupant receives 555 cubic feet of space. At the time of inspection only 22 men were quartered in it, and the cubic space available for each man was consequently 1009 feet. The thermometer marked in this room 49° 5′ Fahr., outside in the air 49° Fahr. Barometer 30 inches. This room is warmed by two Pearce's patent stoves having iron chimneys, with openings in the ceiling close to them. The fires were extinguished. The ventilation here is presumed to be carried on by moveable iron traps or valves set near the roof of the room with one large perforated zinc plate at one end of the room in the same plane. On applying the candle to the latter, it was found that a column of air was moving through it from the room, whilst at the other ventilators near the ceiling the air was passing briskly into this room. There was an up-current also through the openings in the roof around the iron chimneys. The same smell of clothing was alone present in the room, and Nessler's test gave a less quantity of ammonia present than in either of the other rooms examined.

"Leading off from this room, by a door, is a small room or closet used as an ablution room. In this place, which is only ventilated by a large window, the urine-tub was kept, and upon entering it a very strong smell of urine was present. On testing the air, however, by Nesler's solution the ammonia was not found to be in such excess as might have been imagined. The reason of this, perhaps, was that the odour present was not so much due to decomposing urea as to the volatile principle of fresh urine itself, which, having been carelessly sprinkled upon the stone floor around the tub, was facilitated in its evaporation. (Probably phenylic acid.)

"From this report it will be seen that although applied to old barracks, as two of those under consideration are, the ventilating system as recommended by the Sanitary Commission works well as far as it goes, though certainly complaints of draughts being present in some of the rooms are not infrequent.

"I regret that I have been unable to make this report more exhaustive, the means of more thoroughly examining the state of the air not being available, the very important item of carbonic acid not being determined, neither the amount of ozone which was present.

"For the application of Nessler's test an apparatus was improvised in this hospital by means of an enema syringe, some India rubber tubing, and some glass tubes, &c. The solution required was also prepared here from the drugs in store."

Efficient ventilation of the rooms of the Permanent Infantry Barracks at Aldershot having, after certain tentative measures, still remained a problem, Dr. De Chaumont, Staff Assistant-Surgeon at Netley, and Assistant to the Professor of Hygiene, was appointed to carry out a series of experiments on the subject. His scientific report, accompanied by a Table in which the observations are arranged for the convenience of comparison, is to be found in a preceding part of the Sanitary Section of the present volume.

Professor Dr. Parkes, F.R.S., in forwarding this excellent report of his assistant, especially directs attention to the conclusions arrived at, also to the suggestions for the improvement of the ventilation of some of the rooms. One circumstance, he states, is particularly brought out by these experiments, viz., the necessity of a different arrangement of "extracting shafts" in the upper and lower rooms of the barracks. The superiority of the new "ventilating grate" over the old pattern is also, Dr. Parkes points out, clearly indicated by these valuable experiments.

Dr. De Chaumont further, at the request of the Inspector-General of Hospitals, made a set of experiments on the ventilation of the Female Hospital of Aldershot, of some of the huts, and of the guard-room cells at the Permanent Barracks; as the result of these experiments is not embraced in his special report, his separate observations may follow here.

"It had been stated that the new ventilating stoves did not act properly, indeed that in some cases the draught through the air-chamber was outwards instead of inwards. A careful examination with the anemometer showed that in every case a current of air, of a temperature at least 10 degrees above the external air, was passing in while the fire was burning. This current in some of the huts, where the inlet area was very small, amounted to from 700 to 1,000 cubic feet per hour. In the Female Hospital, where the louvre was about the same size as those in the barracks, the delivery was estimated at from 6,000 to 14,000 cubic feet per hour. The discharge by the chimney amounted to from 8,000 to 12,000 cubic feet per hour. The extraction by the wooden shafts was very unsatisfactory from their shortness, as was observed in the case of the upper room (No. 22) in the Permanent Barracks.

"The Guard Room Cells at the Permanent Barracks are ventilated by the following arrangement:—

"*Inlets.*—One grating communicating with an external wall at some distance off.

"One grating above the door, opposite to the former, communicating directly with the guard-room.

"*Outlet.*—One square extraction shaft from centre of roof.

"An experiment, by inserting a diaphragm in the shaft, had been made for the purpose of converting one portion into an inlet and the other into an outlet. This, however, was unsuccessful; both remained outlets, probably in consequence of the presence of the gratings.

"The extraction seemed to work well. During the estimation there were four people in the cell, and a candle was burning. The air was then going out at the rate of 7,700 cubic feet per hour. The arrangement for inlet was bad, the one grating being at too great a distance from the external wall, and the other admitting only the already contaminated air of the Guard-room.

Warming.—This measure, in co-operation with that of ventilating barrack rooms, and as effected by the new remodelled grates very generally introduced within the last few years, has become matter of very satisfactory report by the Medical Officers. On the first institution of the ventilating grates the change from the old pattern met with a very general prejudice on the part of the troops, the new they pronounced to be deficient in the convenience of hobs on which to keep warm the dinner of men delayed beyond the hour on duty, and moreover presenting a less cheerful aspect to the rooms owing to the smaller crater of the grates and the reduced bulk of fuel. The complaint, however, was a passing one, and further familiarity with the operation of the new pattern has brought it into ultimate favour with the men, whilst the advantageous principle of its sanitary action has become well established, and in certain technical details it has been improved.

RATIONS AND COOKING.

Progress has been made in the instruction of cooks at the central kitchen establishment at Aldershot, and trained serjeants from this school have been appointed to regiments accordingly as they satisfactorily completed their course of tuition.

The results of this training system, so far, have been very favourably reported upon. Variety in cooking has now become the general practice; and, although in exceptional instances of corps, the old, unvaried form of soup and boiled meat has held a preference, the advantage of variety is yet likely to prove itself amongst all, when they obtain the services of expert cooks through the new training system.

With reference to the new institution of military cooks, the following are regulations:—

A Serjeant-Cook is allowed to be borne on the strength of every regiment. He is specially selected by his Commanding Officer, and has to pass through a course of instruction at the kitchen at Aldershot, on the completion of which satisfactorily he obtains a certificate. He has subsequently to undergo a probationary period of six months with his regiment before being finally appointed serjeant-cook. He then receives 6*d.* a-day while employed in superintending the cooking of his corps.

The following are parts of his duties:—

1. To be responsible for the proper consumption of the coals.

2. To dispose by sale, under arrangements made by his Commanding Officer, of all refuse from the cooking of the meat, &c., the sum received being divided among the troops and carried to the credit of their messing.

To further improve regimental cooking, and to enable a certain number of men to derive benefit from the instruction of the Serjeant-Superintendent, it is arranged that, in each squadron, battery, or company, one man shall be employed as cook for appointed periods, to be changed on misconduct or other necessity.

The meat-ration of the soldier has remained at the daily ¾ lb. The necessity for the full pound per man is a steadfast creed urged by the Medical Officers, the scant nutrition afforded by the present quantity being a point of annually recurring representation by many of them.

CANTEENS.

These dependencies within barrack boundaries, hitherto leased by the Government to civilians, could never, as a system under such tenure, be expected to secure the soldier's best interest as to quality and price of the articles sold to him, for the business could only prosper to the lessee upon a scale of "per centages" always more or less excessive. The old buildings, too, were almost everywhere defective in accommodation, and affording little attraction to gain the men's preference.

This long-established experience has recently led to arrangements for placing these subsidiary institutions upon improved footing, and, under Government auspices, a new system is in course of development. In this way regimental enterprise in the 69th, lately arrived from India, has established a model canteen in their present barracks at Gosport, and it has been pronounced, short time as it has been in force, to be a great success.

The following heads of a report on this canteen are given by Dr. Huntly Gordon, Surgeon-Major of the Regiment, in reference to consideration of the sanitary economy of his corps:—

"The present system was established in August 1864.

"The canteen is under the management of a Committee composed of three captains.

"The canteen serjeant is changed every six months.

"The President and active Manager carries out the system, which seems to work well.

"Rent is paid to Government, at the rate of 1*s.* per diem, and licenses are taken out for the sale of malt liquor and groceries respectively. Twelve per cent. is likewise charged on the value of what is called "bar stock," *i.e.*, engine for drawing beer, pewter pots. &c.

"The malt liquors are obtained direct from Bass and Co., Taunton and Co., and Guinness; the tea and coffee from Twining and Co. The remaining articles are procured from local tradesmen by tender.

"The average monthly profit has been about 40*l.*, derived principally from the sale of malt-liquor (everything else is disposed of at nearly cost price), which has enabled the Committee to place many means of amusement and comfort at the disposal of the men, and has, besides, enabled them to reduce the daily mess-money from 3½*d.* to 2½*d.*, not only saving the men money, but increasing the quantity and improving the quality of the articles supplied in excess of their commissariat ration.

"The amusements are newspapers, bagatelle-tables, French billiards, chess and draught-boards, the racing game, a small band, consisting of a violin, harp, and guitar, with occasional vocal music and dancing. The rooms are spacious, well ventilated, well-warmed, and lighted with gas; all of which advantages appear to be thoroughly appreciated, as the canteen is well filled at night.

"Last monthly accounts show an expenditure of 198*l.* on provisions against 133*l.* on malt liquor and tobacco, tobacco representing 50*l.* out of the 133*l.* Such a state of affairs is highly satisfactory, and must result in sanitary improvement by the increased consumption of wholesome food, and the diminution of intemperance and consequent crime. The regiment is at present healthy, with but little crime.

"The reporter is of opinion that this new canteen system is one of the most valuable improvements which has ever been made in the soldier's condition."

BARRACK LAUNDRIES.

Government in the course of the last two or three years has built and furnished wash-houses, with drying-rooms and laundries attached, at several of the larger barrack-stations at home, placing them, as a rule, as conveniently in position to the married soldiers' quarters as practicable.

Upon the practical working of these important accessories to the comfort and cleanliness of the troops the Deputy Inspector-General of Hospitals of the Dublin Division, Mr. O'Flaherty, has very specially reported and states, from his own observation, that what ought to be of the greatest benefit to the soldiers, and a means of diminishing rheumatism and chest affections among them, is not made the most of on account, he regrets to find, of the allowance of fuel being insufficient, the drying, ironing, and mangling-rooms in consequence not being resorted to as intended. The result has frequently been that the soldiers' wives wash in their ordinary tubs instead of using the wash-house troughs which, fitted with tubes and taps for hot and cold water, are, in consequence of deficiency or want of the hot water, not availed of.

Mr. O'Flaherty suggests a remedy for this disuse in the following proposal, —that some fully instructed and practical persons should be assigned the duty of visiting the laundries to ascertain exactly the number of hours taken to wash and dry the clothes of each barrack, and into how many days of the week those hours should be distributed. This inquiry would, he observes, show how many persons could wash each day, how many hours the fires would be required for hot water supply, and the drying and ironing rooms be available for use. The actual quantity of coal required might, he conceives, be easily calculated; and, if granted, each regiment could find a superintendent to carry out the system effectually, whilst rules should be instituted and hung up conspicuously. By such a system he thinks that all the regimental washing could be well and economically done. At present it is very doubtful to him that the soldier gets, as a rule, a properly cleaned and dried shirt as often as he has need of one. The Deputy Inspector-General is also of opinion that, if these wash-house establishments were properly worked, the whole of the barrack bedding might be washed in them, and become another source of profit to the soldier's wife and a saving to the public.

This simple and practical scheme of Mr. O'Flaherty would appear well worthy of administration as a health-measure for the troops.

TRADES, &c.

The Report of the Committee of Officers who were appointed about two years ago by the War Office and Horse Guards authorities to enquire into the subject of instructing and employing the soldiers in trades, &c., with a view of occupying much of their spare time in quarters, has apparently led to a satisfactory decision by the Government, as it has been recently announced that a sum has been taken in the Army Estimates towards inaugurating the system, and a circular has been issued to the effect that the Secretary of State for War, having had under his consideration the subject of allotment of garden-grounds to soldiers, has decided that, at camps and barracks, the cultivation of gardens shall be encouraged by the grant to the troops, free of rent, of such portion of the War Department land as can be spared for the purpose, and to an extent that may be required to supply vegetables for the use of the corps by which the gardens are to be cultivated.

It is to be hoped that no ordinary difficulties will be allowed to surmount or long delay the expansion of the principle to such various useful and skilled labour and trades as the men can be employed on,—occupations which, in a few years, would redound to their moral and physical advantage by utilizing, on colonial service more especially, the many idle hours and listless days they have to pass.

GYMNASTIC INSTRUCTION OF THE ARMY.

The Medical Officers have, with special interest, kept under their observation the sanitary results of the gymnastic training now in force, and their reports on these exercises, as practised at the principal stations where gymnasia have been constructed—St. John's Wood, Aldershot, Warley, Chatham, and Parkhurst (Isle of Wight)—are very satisfactory.

Dr. Ross Jameson, Inspector-General, reports of the central institution at

Aldershot that it is scarcely possible to overrate the good effects of the training there in developing muscular power and generally improving health.

Dr. Crerar, lately Surgeon of the Depôt Battalion at Parkhurst, states the gymnasium at that station to be fitted up in a most complete manner and, more especially, reports that he had carefully watched the effect of this department of drill on the young soldiers and is satisfied that the benefits which accrue from it are very great. Most recruits, he observed, after their course of three months at the regulated exercises came out with much increased physical proportions, able to go through great feats of strength and agility.

FOREIGN STATIONS OF THE ARMY.

THE MEDITERRANEAN GARRISONS.

It will be unnecessary to detail the many and special sanitary arrears of barrack and hospital accommodation in the large garrisons of Gibraltar and Malta after the reiteration of them made in the successive reports of the last three or four years. It may suffice simply to state that the garrisons are in the hands of the executive authorities, whose works have been commenced towards carrying out the recommendations put forth by the Sanitary Commissioners who investigated all details in the autumn of 1862.

Of the Ionian Islands, Corfu in particular, the final report of Dr. Francis Innis, C.B., shows that, for the last annual period, the proportion of admissions to hospital (684 per 1000) was unprecedentedly low, and that the decrease chiefly occurred in miasmatic diseases which, however, held their wonted relation to Fort Neuf, situated over the opening of the main sewers of the town; this fact was demonstrated in figures, shewing that 717 men in that fort gave 145 admissions for fever, while 2,155 men quartered in the citadel of Corfu, presented only 146. An equally enormous difference, Dr. Innis observes, had recurred perennially, with unremitting regularity. He states that, as the British interests in the station were so soon to cease, all expenditure during the last year (1863), save for petty repairs, was prohibited, and that the duty of the Sanitary Officer was to make the best of existing circumstances.

His report represents that, during the last five years of the British occupation of Corfu, much labour and money were expended in sanitary progress and in improving the health of the garrison and comfort of the soldier; so much so that, had the station been retained by us, the material reduction in zymotic diseases would have soon repaid, if it had not already done so, all the expenditure.

CANADA.

Inspector-General Dr. Muir, C.B., Principal Medical Officer in Canada, states that the health of the troops in this Command during the year was satisfactory. The principal classes of disease were venereal and such as are directly or indirectly traceable to intemperance, or the effects of climate.

From the withdrawal of a company of Royal Engineers, and a re-appropriation of barrack accommodation in several localities, the cubic space per man was somewhat enlarged; and, although in some buildings the room space was still more restricted than desirable, yet there existed nowhere a limitation to an extent to imperil health. The cooking appliances throughout the Command were in the most satisfactory state, means of varied diet being at the command of every corps and battery. The ablution accommodation was almost equally satisfactory, yet there was in several instances a deficiency of fixed baths, but such were in the course of being supplied. The clothing of the troops was suitable and sufficient; but the adoption of a lighter and looser tunic (serge) for the summer, and white cap-covers would, Dr. Muir thinks, be desirable. There was nothing in the amount or kind of duty calculated to act prejudicially on health. In sewerage and latrine accommodation considerable improvement was effected during the year, and in which respects the Inspector-General particularizes the barracks of the 63rd at London and the Guards' barracks in Montreal.

As a rule, the soldiers' families were well put-up and cared for; the only exception being at Quebec, where the accommodation was inadequate.

The guard-rooms and lock-ups throughout the Command were generally too small (besides often being inadequately ventilated) for the number of prisoners falling to occupy them. The lighting of the barracks by coal oil or gas is a desideratum, Dr. Muir reports, as a means of abating crime and sickness, by attracting the men to remain in their rooms of evenings, instead of incurring evils out of barracks. More soldiers' clubs, covered skittle-alleys, ball and racket-courts, &c., and gymnasia (for winter use especially), are imperatively called for, he states, for the same end.

NOVA SCOTIA.

Deputy Inspector General Mr. McIlree has had nothing of importance to add to the fulness of his Report on this Command for the previous year. A main necessity is still that of additional hospital accommodation for the garrison of Halifax, the strength of which had been so much augmented within the preceding two years and a half; and no less a desideratum is the expansion of barrack-room space throughout the Command to 600 cubic feet per soldier.

BERMUDA.

Special Report on the Epidemic of Malignant Yellow Fever at Bermuda during the Autumn of 1864.

By Surgeon-Major Barrow.

Topography, &c.

The Bermudas are situated in the Western Atlantic, in 32° 15′ north latitude, and 64° 51′ west longitude. They are 3,000 miles from England, and are almost equi-distant from Nova Scotia to the north, the island of St. Thomas to the south, and the North American continent to the west; the nearest land being Cape Hatteras, on the coast of North Carolina, which is 600 miles distant. The islands are popularly believed to be 365 in number, and lie in a continuous chain, in the form of a crescent, from east to west, the concavity facing the north.

St. George's is the most easterly island, and Ireland Island the most westerly, the distance across being sixteen miles. The other principal islands are St. David's, Long Bird, the Mainland, or Bermuda proper, and Somerset Island. The Mainland, or central island, is the largest, but not one of the group exceeds three miles in breadth. Numerous coral reefs, running from east to west, are found at a distance of from ten to fifteen miles north of the Bermudas, causing the navigation to be very intricate and dangerous in stormy weather, although they are serviceable as a means of defence against external enemies. The islands are of no great elevation; the highest is not more than 300 feet above the level of the sea, the average height being from twenty to thirty feet. They present an undulating appearance, and are generally thickly covered with cedar trees (*Juniperus Bermudiensis*), identical with the Virginian cedars. These are evergreen, rarely exceeding twenty-five feet in height, the foliage being of a dark, sombre green colour. The underbush consists almost entirely of wild sage (*Latana salvifolia*).

On sailing among the islands, it is impossible to avoid being struck with the beauty of the ever-changing scenery. Numerous bays and inlets are suddenly brought into sight; white houses lie "dotted" about on the hill-sides, half-concealed among the foliage of the dark green trees. The sun is generally shining brightly in a clear atmosphere. The sea-water is so beautifully transparent, that fish, shells, and coral formations can be seen at great depths. One can scarcely believe that these picturesque islands can ever be the abode of a pestilential and most deadly disease.

Geological formation.

Although some geologists consider the islands to be of volcanic origin, the more general belief is that they owe their existence to the industry of the coral-building polypes, and may thus be called organic formations. Below low-water mark the coral formation is evident, while above is seen the Æolian, which continues in actual progression to this day. On the south shore of the Bermudas, near Paget's Church, the Æolian formation can be well demonstrated. In that locality, an accumulation or drift of finely-comminuted shell and coral, looking like sand, extends along the sea-shore for half-a-mile, and for the same distance inland, thus constituting what are called the Sand Hills. During a stiff south wind the "drift" is carried swiftly inland. From a distance it presents the appearance of a haze or mist overhanging the sand-hills. In process of time this becomes converted into a calcareous sandstone, of various densities, but, generally, of a very soft, porous texture,—so soft, in fact, as to be easily cut with a common hand-saw. This stone is associated, occasionally, with tracts of chalk deposit, which the late Colonel Nelson, R.E., attributed to the decomposition of zoophytes, from the least calcareous to the large and massive Meandrina and Astrea.

These animals, and the many marine plants, consisting chiefly of lime, produce this chalk, just as terrestrial animals and vegetables give carbon to the soil when they decay. The Bermudian stone is thus a conglomerate of comminuted shells and corals, of a white colour, its texture being coarse and friable. It is the material universally used for building purposes, and is even cut into slates for roofing houses. The stone is impregnated with salt, and, consequently, affected by the state of the atmosphere. In damp weather, it absorbs a considerable amount of water; and, on this account, I consider wood preferable as a building material.

Soil.

The soil is very scanty on the hills, but, in the hollows, it is sometimes two or three feet deep, and seems to be composed of finely pulverised shells, coral, and decayed vegetable matter. In protected situations, this soil is often so rich as to be capable of producing, with scarcely any labour, almost every vegetable and fruit known in either temperate or tropical climates.

Marsh land.

Marshes of considerable size are seen on the Mainland. The water is always salt, and rises and falls with the tide, showing its connection with the sea. Intermittent fevers are unknown in these districts, probably from the influence of the tidal flow. Fevers of this type are not met with anywhere in Bermuda, unless imported from other countries.

Water supply.

Fresh water springs are rarely found; in fact, it may be said, do not exist, as the water is always more or less brackish, on account of its filtration through the soft porous rock, which is so thoroughly impregnated with various marine salts. Consequently, rain-water is universally made use of for culinary purposes, as well as for drinking. It is collected in tanks from the roofs of the houses, the stone slates of which are kept well covered with a thick limewash, in order to counteract the natural porosity of the stone.

Where a large quantity of rain-water is required, as for the troops when encamped, the slope of a hill is selected. The face of the rock is then cut smooth, covered with cement, and limewashed, the water being directed into underground tanks, from which it is raised by pumps.

Climate.

From the latitude of the Bermudas (32° 15′ N.), a most delightful climate would be expected, and this is the case during the autumn and spring months, when the thermometer stands at 70° to 74°; but the summer is a most trying season. The thermometer often reaches 87°, the nights being only 3° or 4° cooler. The prevailing wind, at this season, blows from the south. It is saturated with watery vapour, and causes a most distressing feeling of languor and depression of spirits, which accounts for the want of energy and enterprise on the part of the natives, so well described by Trollope.

During the winter, the atmosphere is, at times, loaded with moisture, and so chilly, that a fire is often agreeable. But, if a westerly wind sets in, it compels the Gulf Stream to deviate from its usual course and impinge on these islands, producing a very perceptible elevation of the temperature. The greatest amount of rain falls in the months of July, August, and September, the average summer fall being about 20 inches, and 60 inches in the twelve months.

Fearful hurricanes have been experienced, although, fortunately, at long intervals. Gales of wind and squalls are common in the autumn and winter They are generally accompanied with heavy rain.

Population. The population of the islands is about 12,000, of which number only 5,000 are white. The coloured races are of extremely indolent habits. They are engaged in agriculture to a limited extent. Excellent arrowroot, potatoes, and onions are the only productions exported.

Islands and towns. St. George's Island is the most easterly of the entire group. It is three and a-half miles long, and scarcely a mile broad. The coast is bold and rocky, in some places precipitous. There are several rather lofty eminences, on which are strong military works to protect the town and harbour of St. George's. The latter lies between the south of this island and St. David's Island, and is very capacious. It extends two miles from west to east, its average breadth being about half a mile. The town of St. George lies in a hollow on the south shore. To the west there is a hill about 150 feet above the level of the sea, on which is Fort George and a signal station. To the east there is also a "plateau" of elevated land, on which are the barracks, officers' quarters, military prison, &c. This table land forms a curve to the rear of, and quite encircling the town, which is thus shut out from all winds except those which blow from the south. The streets, or, rather, "lanes," are seldom more than 12 feet wide. They are most irregularly planned, running east and west close to, and somewhat parallel to, the harbour, but quite excluded by buildings from the benefit of the south winds. The houses are generally one-storied, and built of stone, but present a most wretched appearance. The town, in fact, bears a strong resemblance to certain villages in the west of Ireland, and yet this is the principal mercantile port of the colony. The sanitary state is such as might be expected in so miserable a place; most offensive odours prevail on all sides from the various cess-pits and filth of all kinds thrown into the streets. There are no sewers or drains. The only way in which the streets are cleansed is by the heavy rain which occasionally falls, the quantity being greatly augmented by the drainage from the surrounding heights. Thus, here is a small town lying, as it were, in a basin, cut off from all winds, without sewers, full of cess-pits rarely emptied, with no water-supply beyond what is collected from the roofs of the houses, and with the streets unscavengered. When I add that the houses are excessively overcrowded, is it surprising to find that yellow fever here "runs riot," and is of a far more deadly type than elsewhere in Bermuda?

The population, in ordinary times, is about 900; but, at the present moment, is supposed to be 1,500, owing to the number of sailors and others engaged in running the blockade established on the American coast.

A small island is situated exactly south, and in front of the central portion of the town, at a distance of about fifty yards; it is called Ordnance Island, and is covered with rather lofty buildings, which still further prevent the south winds entering the town. In addition, the island keeps off the "sweep" of the tide from the town wharfs, so the water in this narrow channel is somewhat stagnant. This is made evident by the masses of decomposing animal and vegetable matter which are constantly seen floating about almost motionless. Near the western extremity, St. George's Island attains a considerable elevation, and is well covered with trees. It then suddenly slopes in a southerly direction downwards to a narrow neck of land, which leads to a peninsula of undulating appearance, quite devoid of trees or bush, very rocky, and not more than thirty or forty feet above the level of the sea. On this peninsula the head-quarters of the 2nd Battalion 2nd Regiment were encamped during the epidemic, and this locality proved to be healthier than any other in the Bermudas. The reasons, I believe, were that the soil was very scanty everywhere; that owing to the absence of trees, bush, or buildings, there was an uninterrupted circulation of air from whatever quarter the wind might blow; and moreover that the tide so freely swept along the coast, both north and south, as not to allow refuse organic matter to accumulate and decompose. This view is borne out by the fact that on the higher ground to the east, and on the Mainland close to the west, where there is a good depth of soil, and the houses are surrounded by trees and shrubs, fever of a malignant type prevailed to a considerable extent. This small peninsula terminates towards the south at an acute angle, called Ferry Point, and communication is kept up with the next island of the group (the Mainland) by means of a ferry-boat, the distance across being about 200 yards. The mainland is of a crescentic shape, 24 miles long, and three miles broad. The main road runs in a south-westerly direction from the ferry, through a hilly country. Near Bailey's Bay another road branches off, first to the south-east, then at right angles to the south-west, and pervading the entire length of the southern portion of the island, to Somerset, whilst the north road runs almost in a parallel line to the "Flats Village." The two roads almost encircle a large salt-water lake, called Harrington Sound. At the "Flats" there is a middle road leading to Hamilton, lying between the main north and south roads. This passes to the south of the Devonshire Marsh, which is one mile long, and one-third of a mile broad. Directly to the north of Hamilton there is another salt-water marsh, "The Pembroke," of a similar size. Between these two marshes the land attains a considerable elevation, and is known by the name of Prospect Hill. During the epidemic of 1853, a large camp was formed on these heights. The site is very objectionable from the proximity to the two large marshy districts. It was found besides that the men could not be prevented going to the town of Hamilton (one mile distant) at the time fever was raging. This was also the occasion of much drunkenness, and without doubt a large quantity of vile rum was smuggled into camp. From the "Flats" the upper road runs along the north coast, passing to the north of Prospect Hill, and Mount Langton (the Governor's residence), and terminating at Spanish Point.

Hamilton is the seat of Government, and also a commercial port, but having a smaller population than St. George's, from which town it is about twelve miles distant; the main land on its northern side, and about its centre, sends out a spur, which stretches due west for about two miles. Hamilton harbour is formed by the bifurcation, and the town is situated on the north shore, at the east end of the bay. The streets are laid out with some regularity, are nearly fifty feet wide, and run parallel to the shore. Both the site and the sanitary condition of the town are far superior to those of St. George's, consequently yellow fever usually is of a far less malignant type than in the latter place. Some storehouses at the east end of the town were occupied as barracks for 94 men, until the last twelve months, since which time no troops have been quartered in Hamilton.

The west end of the mainland forms a curve to the north, and is connected with Somerset Island by a bridge. This latter island is 2½ miles long, and is noted for its picturesque scenery; the country is very hilly, beautifully wooded and fertile.

To its north lies the small island called Watford, where there is a barrack for 50 men. Watford Island is connected by a bridge to Boaz Island, also of small size. The Convict establishment was removed from Boaz Island about a year since. The prison houses remaining here are very substantial, and could be converted into barracks; the chief objection would be that the buildings do not face the ordinary winds (north and south), and that the drainage is very imperfect; so much of the rock has been cut away by convict labour, that there is scarcely any "fall" for water. There are many handsome villas, with gardens around them, the late residences of warders and other prison officials, which would make excellent officers' quarters.

A camp of 350 men was formed on Boaz Island during the late epidemic, and proved tolerably healthy.

Ireland Island is the last of the group (travelling from east to west), and is situated to the north, or north north-east of Boaz, being connected with it by a bridge. The island is 1½ miles long, and in some parts not 300 yards wide, of a rocky charactcter, not greatly elevated above the level of the sea, the highest land being towards the south, where the Naval Hospital is situated. This building is well planned, the wards are commodious, lofty, and well ventilated; but there are far too many trees in the vicinity of the hospital, a matter of serious importance in this climate. There is no marsh land in the island. The whole of the northern portion is appropriated to the Royal Dockyard Establishment. There are several strong fortifications, and also casemate barracks on an eminence facing the north-east and the lower dockyard. These barracks are built to accommodate 225 men; they are intolerably hot in summer, as the prevailing wind (south-west) is completely cut off by a lofty wall, within a few feet of the rear of the building.

Military stations.

Headquarters, St. George's.

There is only one other military station, St. George's, where the head-quarters are established. The barracks at St. George's are built on a "table land," facing the south-west, and 90 feet above the level of the sea. They are intended to accommodate 278 men, and were built in 1798, on a faulty principle, the men's rooms being scarcely raised above the level of the ground. The state of ventilation, moreover, is defective. In this semi-tropical climate each man should be allowed at least 750 cubic feet of air. At this rate the barracks would only accommodate 185 men. There is supposed to be barrack room for 637 men (at 500 cubic feet of space each) in the various forts and barracks at St. George's; but as 750 feet should be the allowance per man, the actual accommodation should be for 425.

The average strength of the garrison of the Bermudas is about 1,150, while there is only barrack room for 909 men, at the low rate of 500 cubic feet each; at the proper estimate of 750 feet, there would be barrack room for 606 men only. In addition 50 men may be reckoned as being constantly in hospital and in prison; thus, with proper cubic space per man, there would be 494 soldiers without barrack accommodation; or, at the rate of 500 feet, there would be 191 men unhoused, consequently a portion of the force has to be kept constantly under canvas, to the great discomfort of the troops, although perhaps not productive of disease.

It is not my intention to describe the various barracks and forts, inasmuch as they had no connection with the present epidemic, the troops having been moved out and placed under canvas before fever had appeared among them, with the exception of the one (and only) case in the 39th Regiment. I cannot, however, forbear making a few remarks on the Government buildings in general. On my arrival, I was struck at the total absence of precautionary measures against fever epidemics. I saw barracks scarcely raised above the level of the ground, rooms with low ceilings, windows small, so as to create draughts, instead of promoting ventilation; the out-buildings crowded together, and in the close vicinity of barrack rooms, impeding the circulation of fresh air; water tanks close to, or even under dwellings; privies often placed to windward; guard-rooms too small, and one "strong room" being in fact a cellar. The general plan of similar buildings in the West Indies might be copied with advantage. There especial care is taken to protect the troops from injurious telluric influences. The barracks are always raised on arches, and especial care is taken with regard to ventilation and drainage. The quarters for the officers of the line regiment at St. George's proved very unhealthy during the epidemic. They are on the same line as the barracks, and close to the eastern extremity. The rooms are exceedingly small for this climate (16 feet long by 13 feet wide), with low ceilings, so that in summer the heat is almost unbearable. Underneath are kitchens, in appearance more like cellars, with most imperfect ventilation. No one is allowed to sleep in the latter. A ditch runs close in front of the officers' quarters; beyond it there is a grass plot, which, at the west end, is higher than the level of the flooring of the rooms. The whole area of these head-quarters is enclosed by a wall, which not only obstructs the view of the beautiful harbour, but keeps off much of the southerly winds.

The military prison at St. George's is defective in many respects. Several men contracted yellow fever within the building. It is situated closely to the west of the Royal Barracks, on the same "plateau," and is surrounded by high trees, houses, and walls. It is, in fact, cut off from all winds. A stable has been built quite close to the north, and an upper storey is being added to the east side, which will increase the closeness of the air within the building. Last summer, I found the heat to be excessive in the central square. There are sixteen single cells, each being 10 feet by 8, and 10½ feet high, and three larger cells, 14 feet by 11, and 10½ feet in height. These cells accommodate three prisoners each in summer and four in winter. Six new cells are being constructed. All are tolerably well ventilated. The privy is too close to the cells, and is a mere cess-pit. The enclosed space is far too small for a military prison in this climate.

General hospital, St. George's.

The General Hospital is situated 350 yards to the rear of the Royal Barracks, but at a much lower level, and close to the sea, thus affording facilities for drainage, &c. It lies in a hollow facing the south-west. There would have been a better site for it on higher ground not 100 yards to the west; the building should have been also raised on arches. It is constructed of stone, two stories high, the entire block being surrounded by a broad verandah. On the ground-floor are two small surgeries and two rooms for hospital sergeants, and two wards, one on either side of the central passage. The latter are each 27 ft. 8 in. long, 21 feet 2 in. broad, and 10 ft. 1 in. high. On the first floor there are also two large wards, each being 40 ft. 8 in. long, 21 ft. 8 in. broad, and 12 ft. 6 in. high. In addition, there are three small wards, of about 11 ft. by 10 ft, and 10 ft. high. They are all well ventilated and cheerful-looking.

The hospital is intended for forty-eight patients; but, allowing each man 1,500 cubic feet, it would only accommodate twenty-four. There are four water-closets, one at the end of each ward, and external to the building. Their water-supply is obtained from tanks, which are daily filled by a force-pump from the rain-water reservoirs below. In dry seasons this water can scarcely be spared for such purposes. I am, therefore, about to recommend the use of sea-water, to be raised by wind-mill power, as at the Naval Hospital. This was proposed many years ago by Dr. Logan, but without effect. On the basement floor, under the lower wards, there are two large store-rooms and a small pack-store. All are more or less damp; but, under any circumstances, I consider it very objectionable to have store-rooms under a hospital, more especially in a yellow fever climate. Additional ventilation is required for these rooms, as at present the atmosphere is damp and stagnant to a considerable degree, and must, consequently, be detrimental to the health of those occupying the wards above. There are the usual out-buildings, but they are all built on too small a scale, and should have been spread over a larger extent of ground. The privies are forty yards from the hospital. At the west angle of the boundary wall, a short sewer leads from them to the sea. Authority has been obtained to enlarge the General Hospital by adding two wings, but the work will, probably, not be commenced next year.

Should my recommendations be acted on with regard to reducing the number of white troops at Bermuda, additional hospital accommodation may not be required.

Next year a new system of sewerage is to be commenced. A main sewer is to be constructed, which will receive the contents of all the privies and small sewers in the vicinity of the barracks. Water will be raised by steam-power from a salt-water well on the highest level, by which means the sewers can be effectually flushed several times daily.

A new burial-ground is much required. The present one lies about 300 yards to the north-west of the hospital, and is quite full of graves. A site should be selected further removed from the General Hospital.

Epidemic visitations.

Very little is known about the earlier visitations of yellow fever in Bermuda. The first malignant fever recorded was in 1699. Another occurred at the end of 1779 and beginning of 1780. This was called "gaol fever." In 1796, there was a severe visitation, commencing at the west and travelling eastward. The next was in 1812, and was very fatal among Europeans, both in the dockyard and St. George's, but natives did not suffer. In 1818, an outbreak commenced at Ireland Island. It travelled slowly eastward, reaching St. George's early in 1819, at which station a company of sappers, forty-five strong, lost half its number. There was another outbreak in 1837, when the disease, for the first time, was specially mentioned as being "yellow fever." It commenced on the 10th October and did not spread. Probably cold weather set in and checked its career. There were forty deaths among sailors, artificers, and convicts. In 1843, there was a terrible outbreak. On this occasion, it commenced at St. Georges' in July, where it arrived at its intensity about the 16th, 17th, and 18th August, almost subsiding by the end of September. At Ireland Island it was a month later, and at Hamilton it broke out at a much later period. Out of 229 fever cases among the civil population, 8 ended fatally. Of the troops, 10 officers, 167 men, 12 women, and 4 children died. Ten years afterwards there was another epidemic outbreak which proved more fatal to the troops than any either before or since. In 1853, the fever commenced in a hulk at Boaz, on the 5th July. Only two or three other cases appeared until the 16th August, when the disease had travelled eastward, and became epidemic in the hulk "Thames," which was moored close under St. George's Heights. It soon spread to the town and the Royal Barracks, where the troops were so overcrowded that each man had only 380 cubic feet of space. It spread to the various forts and to isolated houses so rapidly as to do away with the idea of contagion. It appeared at far distant localities almost simultaneously. It was epidemic from the 16th August to the end of November, and was at its intensity from the 20th September to the 10th October. It, however, lingered at St. George's until the end of the year. The subsidence was gradual, but the cases did not become less fatal almost to the last. The shipping did not suffer from the disease. 15 officers, 297 men, 29 women, and 30 children died of the fever. Among the men, nearly 45 per cent. attacked died, and 58 per cent. of the strength were admitted into hospital with fever. Of the officers attacked, 60 per cent. died. There was great delay in placing the troops under canvas, and this greatly increased the mortality. The excessive death-rate among the officers was caused by the large proportion of them who lived in their quarters throughout the epidemic. In 1856, there was a much slighter visitation. The first case appeared in Somerset Island on the 5th August. The next occurred at Hamilton on the 8th August, then at Ireland and Boaz. It is stated that cases made their appearance at distant places almost simultaneously. Only three soldiers were attacked at St. George's, and none died Three of the townspeople were attacked, but all recovered. There were 44 cases of yellow fever in all among the military, and only three deaths out of a strength of 1,326. Among the civil population (numbering 11,000) there were 1,084 cases and 88 deaths. These are all the epidemics that have been recorded; but without doubt there have been several of a less serious nature previous to the commencement of the present century. It has been affirmed that no autumn passes away without one or more sporadic cases of yellow fever occurring.

Question of origin—1864. The first question to be considered is whether the disease originated in the colony, or whether there is any proof of its importation. The natives repudiate the idea that any pestilential disease can originate in their beautiful islands. It is certainly against their interest to admit such an imputation, as epidemics greatly affect their trade. They assert that yellow fever is always introduced by the shipping. This matter has, however, from time to time been most carefully searched into by Boards of experienced Medical Officers, as well as by Military Commissioners. The result is that on no single occasion can importation be proved. The natives declare on this occasion that yellow fever was introduced from Nassau by a blockade running steamer, the "Annie." This vessel left Nassau (where yellow fever had just broken out) on the 9th June, and arrived at St. George's on the 13th, without a single case of the disease having occurred. The ship coaled, and proceeded to England and no fever case appeared during the voyage. The Health Officer for this port (Assistant-Surgeon Burland, R.A.) has furnished a good report, in which he examines the history of all the earlier cases, and quite disproves a statement made by Dr. Outerbridge, a civil practitioner, who affirms that the first cases of fever were contracted on board the "Annie," by a coloured family named Tucker. It is shewn in Dr. Burland's report that the two men alleged to be the first attacked, had never been on board the "Annie." The first man, Henry Tucker, was attacked on the 19th June, the second, John Tucker, on the 21st, the third man, Christopher, forgets the date of his attack but was never in bed. All recovered and there is scarcely a doubt that none of these cases were yellow fever, but ephemeral.

The first true case of yellow fever did occur in a man named Alton, who arrived from Nassau in the steam-ship "Annie," on the 13th June. Before embarking, and also on board ship, he suffered from intermittent fever, of the tertian type. On landing he consulted Dr. Hunter, a civil practitioner, who at once diagnosed the disease, and treated it accordingly. I carefully inquired into all the circumstances connected with this man. He was living in a house on high ground, to the rear of the civil prison, at the west end of the town, but the house was situated in a "hollow," a hill rising close to its rear, with a dense jungle of bush and cedar trees on all sides. The owner of the property declared that Alton seemed quite well when he had not the "shakes," and frequently went into the town. On the 25th (twelve days after landing) continued fever set in, he became yellow and died with black vomit on the 30th June. A coroner's inquest was held; the finding of the jury was indeed extraordinary;

it was "That Alton died by the visitation of God, but whether from yellow fever or not the jury could not determine." It was too much against their interest to aver yellow fever.

The second case was that of George Williams, also a blockade runner, who arrived at St. George's on the 10th June, in the steamer "City of Petersburg" he was living near the civil prison when he was attacked, which was on the 10th July, thirty-four days having elapsed since he left Wilmington (a healthy port) and forty-five since he left Nassau; this long interval of time proves, therefore, that he must have contracted the fever at St. George's. He had had no communication with Alton, the first man attacked, as far as is known.

Williams died on the 17th July, with black vomit, and intense yellowness of the skin. These include the whole of the cases brought forward in evidence of the alleged importation of the disease, which they most signally fail to prove. The evidence altogether points to the town of St. George's as being the starting point and nucleus of the disease, and as the two men first attacked were new comers, they were particularly susceptible to the toxic influence.

In the Bermudas there is every essential for the development of yellow fever, the requisite degrees of heat and moisture, proximity to the sea, an overcrowded! population, a constant succession of new comers, and the islands also lie within the yellow fever zone.

Atmospheric conditions.

In every treatise on this disease we find it insisted on, that for its development a peculiar state of the atmosphere is necessary, in conjunction with a terrestial influence. We know nothing about the essential condition of either influence; still there is clear evidence that both have a marked effect on fevers, and on disease generally. Agues for instance are certainly produced by terrestiral emanations, and at the same time greatlyi nfluenced by aerial phenomena. A heavy fall of rain has frequently stopped, for a time, the development of yellow fever in Jamaica, probably by mechanically preventing emanations from the earth.

In the report of the epidemic of 1853, it is stated that the outbreak of hœmagastric fever was attributable chiefly to an unusually rainy season. The epidemic of 1856 is confidently declared to be owing to the unprecedented dryness of the preceding months. These opinions appear conflicting; my experience is, that every country in the world has a standard climate, depending on latitude and geographical position; any marked deviation from that standard is almost certainly followed by a corresponding increase of sickness. The months of April, May, June, and July, 1864, were not noticeable for any unusual atmospheric condition, there was an average degree of heat, and amount of rain, with the usual winds of the summer months.

Epidemics of hœmagastric fever generally give notice of their approach by the appearance of sporadic cases; sometimes a mild form of other zymotic disease forewarns us. In 1843 the epidemic was preceded by cases of slight ephemeral fever, and by an unusual prevalence of diarrhœa; it was also observable in 1856 to some extent. This year the first case was sporadic, not being followed by any other for a period of sixteen days. Many exceedingly slight attacks of ephemeral fever were also noticed among the men of the 2nd Battalion of the 2nd Regiment by the surgeon (Dr. Cogan); the marked symptoms being headache and pains in the back, with scarcely any acceleration of the pulse, or increased heat of the skin; the men were not considered sufficiently ill to be admitted into hospital. These cases were supposed at the time to arise from undue exposure to the sun, or to an over-indulgence in drink, the regiment having just arrived from Gibraltar. After eight or ten days, decided cases of yellow fever presented themselves in the corps. It would thus seem as if the epidemic were a gradual aggravation of the ephemeral fever, which at length became intensified, and exploded in the form of specific yellow fever.

Dr. Hunter, of St. George's, informed me that, for some weeks previous to the epidemic, he had met with an unusual number of cases of jaundice, and among the coloured people typhoid fever of a mild character.

The third case of yellow fever was not a well marked one. Surgeon-Major Franklin was seized with fever on the 10th July (on the same day as George Williams); the attack was mild, marked by imperfect remissions, and was considered at the time to be remittent fever, but Drs. Burland and Hunter, who attended him, have since come to the opinion that it was a slight case of icterodes.

Mr. Franklin after a week got sufficiently well to proceed to Hamilton for change of air, when a gangrenous abscess under the glutei muscles made its appearance, accompanied by dysentery. He died from exhaustion on the 26th July, his constitution having been greatly debilitated by a lengthened period of service in India.

On the 15th July (five days after the appearance of the second confirmed case), the 2nd Battalion of the 2nd Regiment, 756 strong, arrived from Gibraltar, in the troopship "Orontes," having been fifteen days on the voyage. The men disembarked in good health, on the 16th July; seven companies were placed under canvas at Boaz Island, and three companies with the head-quarters were encamped at the Navy Tanks, on undulating ground devoid of trees or bush, and at a distance of about half a mile from St. George's.

In a week's time a fourth company joined the head-quarters from Boaz. The 2nd "Queen's" had come to Bermuda to relieve the 39th Regiment, the head-quarters of which corps at the present time occupied the Royal Barracks of St. George's. On the same day that the 2nd Queen's were encamped near St. George's, a sergeant of the 39th Regiment was seized with true yellow fever, and died with black vomit, in hospital on the 22nd July. On the 17th July, a civil physician (Dr. F. Hunter), who knew too well the sad history of the epidemic of 1853, called on the officer commanding the 2nd Battalion of the 2nd Regiment and warned him of the approach of another visitation, and of the danger of keeping the regiment encamped so near the town of St. George's, recommending also a quick removal to Ferry Point. This warning, however, was unheeded by the authorities, and not until fifteen days afterwards were the head-quarters of the 2nd Battalion of the 2nd Queen's removed from this dangerous locality.

The next case occurred in the hospital of the Royal Artillery, on the 23rd July (the day after the death of Sergeant Cooper, 39th Regiment). Gunner Ross at the time of seizure was employed as a hospital orderly, and had had no contact with any of the previous cases; he died on the 31st July.

The Artillery Hospital was a hired building, close to the waterside, adjoining Penno's Wharf, at the extreme west of the town of St. George's; the site was very bad; abominable odours pervade the neighbourhood, partly from the filthy drainage of the more elevated portions of the town trying to find its way to the sea, but more particularly from the number of cess-pits on all sides. The first four cases appeared at this end of the town but at different levels. The cottage where George Williams (2nd case) was attacked was very near the hospital but somewhat higher above the sea. The room he occupied was on the first floor, very small, and without ventilation. To the rear were four privies (cess-pits) in tolerably close proximity. The residence of Surgeon-Major Franklin was situated a short distance to the west of this house at the entrance of the town. Far again to the north, near to the summit of the high land overlooking the town, was the house before described in which Alton (1st case) died.

On the 23rd July the head-quarters of the 39th Regiment marched from the Royal Barracks, St. George's, to Ferry Point, and were encamped, the sergeant (before mentioned) having died on the previous day. No other case of yellow fever appeared in this regiment. A fourth company joined the 2nd Queens at Navy Tanks on the same day.

The troops at this period were thus stationed:—

Stations and strength.

Corps.	Station.	Strength
Staff Corps	St. George's	7
Royal Artillery	Encamped	115
„ Engineers		152
2nd Battalion 2nd Regiment ..		350
Head Quarters of the 39th Regiment	Ferry Point	483
Staff Corps	Ireland Island ..	3
Royal Artillery	Encamped	94
„ Engineers		15
39th Regiment..		206
2nd Battalion 2nd Regiment ..		406
	Total	1841

The first case of febris icterodes in the 2nd Battalion of the 2nd Regiment appeared on the 23rd July, at the camp Navy Tanks, the man had been in the town of St. George's previously; the case proved to be a very slight one; next day two other men of the corps were attacked, both recovered. On the 25th July the disease appeared in the Civil Prison which is situated in the western outskirts of the town, on the slope of the northern heights, and about half way up. The situation is tolerably airy, but the grounds are enclosed by a very high wall. Three male prisoners, two of whom slept in cells on the ground floor were seized with fever on the same day, they had been in prison for some time previous to the commencement of the outbreak, so the likelihood of contagion was done away with. Of nineteen prisoners, twelve were attacked but none died, speaking well for the sanitary condition of the establishment. A civilian servant was admitted with fever in the Royal Artillery Hospital on the 26th July, and died in four days with black vomit. He had been living in the town. A private of the Royal Engineers was attacked the same day, this man recovered. He came from a camp near Navy Tanks.

The 39th Regiment embarked on board the steam-ship, "Orontes" on the 26th July, and sailed the next day for England. It is a pity the 2nd Battalion of the 2nd Regiment was not sent to Halifax in this vessel. The ship could have returned, and then taken the 39th Regiment home.

Fatal cases now began to appear in the 2nd Queen's at St. George's. A man was admitted from the camp at Navy Tanks on the 27th; he died on the 3rd August with black vomit. On the 30th, six of the "Queen's" were admitted from the camp, two died the same day, with black vomit, having been ill some days previously.

The epidemic had fairly set in, and was daily growing in strength, but not for four weeks did it arrive at its maximum of deadliness. The site of the camp at Navy Tanks I have before described; in itself it seemed good, but it was so near the town, that it was all but impossible to keep the men out of it. The facilities for obtaining drink were also very great. The very fear of the disease urged numbers even of steady men to drink to excess. It was not long, however, before the epidemic influence reached the neighbourhood of this camp in force.

The Royal Artillery and Royal Engineers had been promptly turned out of all forts and barracks, and encamped on the heights around Fort Victoria, near the camp of the 2nd Queen's. It will be seen in the return of daily admissions, that the Royal Artillery were not seriously affected by the disease until about ten days after the 2nd Queen's; and that the Royal Engineers were not attacked in force until after another period of ten days. Acclimation will I believe account for this, as the Artillery and Engineers had been about two years in Bermuda.

The men lived in bell tents of double canvas, with ventilating flaps, there were only three men in each tent, their bedsteads were made of iron, and the mattresses of horsehair. Every attention was also paid to the sanitary condition of the camp grounds, which was exceedingly necessary considering that a force of nearly 550 men was living under canvas on a somewhat limited space of eligible ground.

On the 1st of August the head-quarters of the 2nd Battalion of the 2nd Regiment marched to the camp at Ferry Point, lately vacated by the 39th Regiment, leaving behind 6 officers and 56 men for various fatigue duties. The removal came too late; it was a serious error indeed to have kept for fifteen days a large body of unacclimated troops in so dangerous a proximity to St. George's. The consequence was that, for at least a fortnight after the arrival of the men at Ferry Point, their system was saturated with the pestilential miasma, and daily admissions from fever occurred of which several ended fatally.

The Artillery and Engineers remained still later on their camp ground. It was not till the 16th and 18th August that they were sent to another camp outside Fort Cunningham, by which time 43 cases had appeared among them, 6 ending fatally.* For three weeks afterwards numerous cases and deaths occurred, which cannot be attributable to any unhealthiness of their new camp ground.

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* It was stated that the delay in moving the Artillery and Engineers from St. George's was owing to the scarcity of Medical Officers.

At the time the camp near St. George's was broken up, the Head-Quarters of the Forces, Commissariat Chest, Civil Departments, General Hospital Establishments, &c., all remained behind, causing a lamentable loss of life, for the duties could not be carried on without the assistance of a considerable number of men, who were employed as orderlies, servants, boatmen, signal men, grave-diggers, ration-drawers, &c. These men were constantly being struck down by disease, when a demand was made upon the camp at Ferry Point for a further supply. The drain upon that camp was at last so great that there seemed a probability of the whole force being expended. This state of affairs continued until the first week in September, when the requisitions on this camp ceased. In the case of the officers living at St. George's, the mortality was even more fearful. Out of 30 officers who contracted the disease in this vicinity 14 died, or nearly 50 per cent. At other stations only 10 officers were attacked, but none died. The inference is, therefore, that had the 14 officers who died been removed to the camps, at the commencement of the epidemic, their lives would have been saved.

I must now resume the thread of my narrative from the 1st August. On that day 12 women and 11 children of the 2nd Battalion of the 2nd Regiment were sent from St George's to Boaz.

The defective situation of the Military Prison I have already described. With its vitiated and stagnant atmosphere there could be little hope for the prisoners escaping a visitation of fever. On the 2nd August, a man of the Royal Artillery was attacked here, and sent to the General Hospital. Two other prisoners were seized on the 4th August, one of whom died, next day also 2 were attacked. On this account the remaining prisoners (20 in number) were removed to a barrack room. Here they received an addition of 3 to their strength, and during the next 13 days 5 men were sent to hospital. Of the 10 cases, 2 ended fatally. By the 19th August, all 3 warders were prostrated by the fever (2 dying subsequently), so the establishment was on that day broken up, and the prisoners rejoined their corps. Five after rejoining had fever, and 3 died. The remaining 13 were sent to Halifax. Thus out of 28 men, 15 were attacked and 5 died. The prisoners of the 2nd Queen's suffered greatly, being an unacclimatized corps, 7 of these men were seized with fever and 4 died. On making inquiry about the earlier cases, I find that the first man attacked had been more than a year in prison, the second man more than six months at the time of seizure, so the possibility of contagion is out of the question. On examining the cells where the first cases seemed to originate, I could detect no local cause likely to be detrimental to health, but the defective sanitary condition close outside the walls must have affected the prisoners to some extent.

As the disease was becoming more fatal in the town, it was considered advisable to break up the Royal Artillery Hospital Establishment. This was done on the 2nd August, when seven of the sick were transferred to the General Hospital. Two of the men were suffering from fever, one from an ulcer, another from a slight contusion, a fifth from ebriositas (a convalescent), a sixth from a fractured jaw, and the remaining man from lupus of the nose. They were treated in a marquee not far from the General Hospital. The two last men contracted fever, and died in a fortnight.

At this period the main guard of St. George's was removed from the centre of the town to Ordnance Island, scarcely a change for the better. It was composed of 2 non-commissioned officers and 12 men. On the 12th August, all guards were abolished, except the hospital one, which was discontinued on the 19th August. All public works were also stopped, as well as parades and drills.

Two coloured female nurses were employed at the General Hospital on the 2nd August. This number was gradually increased up to 12 by the 12th August, up to 29 by the 22nd August, and to 70 on the 7th September, at which time about one-third were male nurses They were paid 10*s*. a-day (*i. e.*, for every twelve hours employed), and received full rations in addition. It was with some difficulty that they were procured, even at that exorbitant rate, on account of the demand for nurses on all sides. Nearly 60 were employed in the hospital during the beginning of September, and about a dozen were attending sick officers, or members of the Civil Departments. They greatly economized the employment of soldiers, and thus saved many lives, for at the height of the epidemic almost every European who came near the vicinity of the town was attacked. I did not find them, however, nearly so useful as the trained nurses in Jamaica. They have peculiar notions about totally excluding fresh air from rooms in which there are fever cases, even with the thermometer at 82° or 84°. On this point they are very obstinate, and they put great faith in charms, tying herbs around the wrists, &c.

By the 13th August there had been 60 cases of fever, and 17 deaths among the troops at St. George's.

On this day, Mr. Cogan, Surgeon of the 2nd Battalion 2nd Regiment, and Senior Medical Officer, was seized with the disease, and in two days the two remaining Medical Officers (Assistant-Surgeons Burland, Royal Artillery, and Pennington) were also prostrated. In this dilemma, Staff-Surgeon McSwiney, Royal Navy, volunteered for duty with the troops, and was so employed from the 14th to the 22nd August. His services were then required at Ireland Island. Surgeons Cogan and Burland, having been but slightly attacked, were again able to resume their duties; but as they were much debilitated it was necessary to obtain the assistance of a civil practitioner (Dr. Higgs) until the arrival of Medical Officers from British North America, as there were upwards of 70 cases in hospital.

The anxiously looked-for medical assistance reached Bermuda on the 23rd August, two Assistant-Surgeons arriving from Halifax. In two days there was a further accession of strength, as seven Medical Officers (including myself) arrived from Canada, having accomplished the journey from Montreal in seven days. Being the Senior Medical Officer, the administrative duties fell to my lot. Having had an immediate interview with the Officer Commanding the troops, I found the situation to be as follows:—"There had been 238 cases of yellow fever among the troops at all Stations, and 65 deaths (including four officers), of which 53 had occurred in St. George's. There were nearly 100 sick in the General Hospital and in tents pitched at some little distance from it. Many new cases were presenting themselves. On the 25th there were 13 admissions."

The disease had been epidemic at St. George's for about four weeks, and it could not be determined whether the maximum of intensity had been reached. The epidemic was showing no virulence as yet at any other Station. There had been 35 cases and 9 deaths at the camp, Ferry Point; but it appeared that all these cases had originated at St. George's. At the camps at Ireland Island and Boaz, there had been 35 cases (of an exceedingly mild type), and only 3 deaths. At the remaining camp, Fort Cunningham, there was no hospital, the sick being sent in for treatment to the General Hospital. The force of Artillery and Engineers had only been there for a week. All their cases had originated at St. George's. My instant attention was, therefore, directed to the state of St. George's, where the fever was proving so fearfully destructive. The cause of the mortality was at once evident; the epidemic had fixed itself upon the town and its immediate neighbourhood with great intensity, as would be naturally expected from its filthy, overcrowded, and utterly neglected condition; and, although the troops had been removed to camps, more or less distant, the General Hospital Establishment, Commissariat, Purveyors, and Ordnance Stores, &c., had been allowed to remain either in the town or in its close vicinity. It was consequently necessary (as I have before stated) to send in a large number of men for various "fatigue duties," as messengers, hospital orderlies, grave-diggers, servants, boatmen, ration drawers, &c. These men withstood the disease but for a short time, were then sent to hospital, and replaced by others. It was too late now to think of removing these stores, neither sufficient labour nor carriage could be procured for the purpose; unless a large force was brought in from Ferry Point, in which event one-half of the men would probably be struck down. The object was to prevent any of the troops approaching this deadly atmosphere; I felt it my duty at once to most strongly urge the immediate employment of Blacks at St. George's, and to send back every soldier to his camp as quickly as possible. There was a considerable difficulty in obtaining the services of coloured men, on account of the large number employed by captains of blockade-running ships at very high pay. They, however, were obtained by degrees, when, as a matter of course, there were no more admissions, nor deaths caused by fatigue duties. It will be seen, by referring to the daily returns of admissions, that, after the 13th September, there were no further admissions in the 2nd Queen's at St. George's, except two or three relapses. A few men of the Artillery and Engineers were still admitted from the camp at Fort Cunningham. Some of the cases were relapses; but most were caused by men coming in to St. George's on various excuses of duty, the distance being only 1¼ miles. The disease very soon found out these men. I should state, however, that sufficient Blacks could not be obtained to carry on the "fatigue duties" of Camp Cunningham, as well as St. George's.

The following was the distribution of the troops on my arrival. The head-quarters of the 2nd Queen's (264 strong) was encamped at Ferry Point, three miles south-west of St. George's, they had 15 men in hospital. The remainder of the regiment (349 strong) was encamped at Boaz in the west of the Bermudas. A camp of the Artillery and Engineers was formed on the glacis of Ireland Island, close to Boaz, their strength being 100. The sick from these two camps, 26 in number, were treated at the Royal Naval Hospital, Ireland Island. Ten men of the Royal Engineers were encamped at the village of Walsingham, two miles south of Ferry Point. The last camp was formed on the heights around Fort Cunningham on Paget's Island, at a distance of rather more than a mile from the town of St. George's, in a south-east direction. There were then 217 men of the Royal Artillery and Engineers at this camp of Fort Cunningham their sick were treated at the General Hospital at St. George's. Bell tents of double canvas were in use at all the camps, there were 3 men to a tent, each man having an iron bedstead, horsehair mattress and bolster. Where the sick were treated in camp, 7 men were placed in each hospital marquee, the ground being planked over.

On account of the rapid and sudden influx of sick, I found the General Hospital to be exceedingly overcrowded; there were nearly 70 men in the building, which could not properly accommodate 35. The sick were not only lying around the wards, but may be said to have covered the entire floor. This required remedying without delay. I do not know any sight more appalling than the wards of a hospital crowded with yellow fever patients; it is as ghastly a spectacle as a field hospital after a sanguinary engagement. The totally altered expression of countenance is remarkable in many cases; anxious in some, bloated or leaden in others, the suffused eyes, yellowness of the skin, the oozing of thin black blood from the gums, or from the nostrils, ears, or in conjunction, give a peculiarly hideous appearance to the sufferers. Here a strong man is seen in violent convulsions, rapidly followed by black vomit and death; there may be seen one lying in a state of calm and utter indifference to everything around him, a sudden turn of the head, followed by a forcible ejection of the inky vomit, too surely indicates his approaching end. Delirious muttering is heard on all sides. This is a spectacle more than sufficient to inspire horror in the minds of those unaccustomed to such scenes; the impression can never be effaced from the memory even of the most stoical. To professional men the prospect is truly disheartening, knowing how little control all treatment exercises over this malignant pestilence, even in the present advanced state of medical science.

The hospital was at once eased to some extent by placing convalescents and others fit to be moved under canvas, but at the same time I recommended the immediate removal of the sick to a healthy locality. Steps were taken to transfer the Hospital Establishment to Ports Island, not far from Hamilton, as there was a building on the island, formerly used as a Quarantine Hospital. Then arose a difficulty in procuring labour and transport; additional bell tents and marquees had also to be sought for; while these preparations were going on the sick were pouring into hospital, the epidemic had gained its height; and another misfortune now occurred, all the Medical Officers lately arrived at St. George's from Canada were struck down with fever, one after the other, our fresh blooded condition seemed to render us peculiarly susceptible. I was the first attacked, on the 29th August, four days after arrival. Two other Medical Officers were seized with fever the same evening, a fourth was prostrated on the 30th, and two more on the 31st. Four out of the six attacked died, a very large mortality; but, in addition to the fact of our having arrived at a time when the epidemic influence was in full force, it must be remembered that the Medical Officers were exposed more than others to such exciting causes as over anxiety and fatigue, great exposure to the sun's influence, as well as to the night air.

One of the six Medical Officers attacked was the Assistant-Surgeon of the 2nd Queen's. He contracted the disease in St. George's, and died at Ferry Point on the 31st August, six weeks after his arrival in the colony.

The Medical Department was soon still further crippled by the death of the Purveyor on the 5th September.

Having carefully perused (within the first few days after my arrival) the excellent report of the Medical Board of 1853, I felt quite convinced that the most prudent course to pursue was to send away the greater part of the garrison to Halifax, leaving the defence of the islands for the time to the Royal Navy; the convict establishment having been removed from Bermuda for more than a year, there was less necessity for retaining so large a number of the troops. I accordingly wrote a letter on the subject on the 29th August, strongly urging the officer commanding the troops to lose no time in carrying out the measure, as there was no knowing what the loss of life might otherwise amount to. This letter was forwarded to Halifax by the first ship leaving Bermuda. The number of malignant cases now became so numerous that it was useless to think of removing the Hospital Establishment. Under any circumstances none but the slighter cases would bear the fatigue and excitement of transport, and these I considered would probably recover on the spot, particularly if placed under canvas. Ports Island, moreover, might not turn out to be a very favourable locality for these cases, as in Dr. Innes's Report of 1853, it is stated a number of cases originated there, although the change had a beneficial effect onthe mild cases then transported from St. George's. I also knew that the commandant was procuring black labour by degrees, and that in a few days no soldiers need enter St. George's, after which the admissions into hospital must cease. I therefore requested the Surgeon of the 2nd Battalion of the 2nd Regiment to erect the hospital marquees on high ground, to the north-west of the hospital, and treat fever cases in them. The effect of spreading the sick over a large extent of ground was encouraging, the hospital building was gradually so thinned of patients that the ground floor was altogether unused, and the upper story was set apart for the graver cases.

The weather was very sultry during the end of August, the thermometer fluctuated from 82° to 86° at noon, southerly winds prevailed, which from being surcharged with watery vapour, proved relaxing and enervating to an extreme degree. Seventeen fever cases were admitted into hospital at St. George's on the 31st August, increasing the sick list up to 100, of which number about 20 were convalescents.

On the 1st September, south-west gales set in, accompanied by torrents of rain; the effect upon the progress of the disease was marked. The admissions which had been 17 on the previous day at St. George's (including the cases from Fort Cunningham) dropped to 8, next day to 5, on the 3rd there were 8, on the 4th 3. The mortality, however, did not appear to be influenced. The effect was also very marked at the camp, Ferry Point, but not to the same degree at Boaz and Ireland.

Violent thunderstorms also occurred during the night of the 7th September, and the whole of the 8th, the force of the south-west wind reached (10), heavy rain falling at intervals. During the three following days there were only five admissions at St. George's, while at Ferry Point there were no admissions for a week afterwards, and only 5 at Boaz and Ireland during the same period. About the same time blacks had been obtained in some numbers; the services of the men of the line regiments were now, therefore, not required in St. George's; no more requisitions for labour were made upon the camp at Ferry Point, so the admissions into hospital ceased.

But for the next fourteen days a few men were admitted from the Artillery and Engineer camp, at Fort Cunningham, as they had to send men into St. George's for rations, &c.

By the 25th September the epidemic was at an end, as far as the troops at St. George's, were concerned. It declined rather earlier in this town, but then it commenced there somewhat earlier.

As a temporary measure while blacks were being sought for, all soldiers employed on daily fatigue duties near the town were sent by boat every evening to a small camp on Smith's Island, about a mile south of St. George's, returning to their labour every morning. Not much benefit could be expected from this measure as the men were breathing a pestilential atmosphere the entire day.

Between the 5th and 14th September the assistance of two civil practitioners had again to be sought for, as all the Medical Officers in St. George's were either dead or prostrated by fever, except Dr. Cogan.

Three Medical Officers arrived at Ireland from Canada on the 6th September, but I refrained from ordering them to St. George's, knowing they would certainly be struck down within a few days of their arival.

Her Majesty's steam-ship "Galatæa" arrived on the 6th September in order to transport 200 of the troops to Halifax; the order was for convalescents only to be sent away (probably from the fear of contagion). I strongly protested against this, the lives of the convalescent were secure, my object in sending away the troops was to save further loss of life among the healthy men. The officer commanding naturally hesitated to disobey a positive order; but, on my expressing a willingness to accept the entire responsibility, 8 officers and 200 healthy men of the detachment of the 2nd Queen's at Boaz were embarked in the "Galatæa" in medical charge of Drs. Mills and Meadows, and sailed for Halifax on the 10th September. I had hoped that at least 500 men would have been sent away at one time. As there was only room for 200, the "Galatæa" returned on the 21st bringing large supplies of ice, live sheep, poultry, and medical comforts, &c.

A second detachment was embarked consisting of 40 officers and 150 healthy men of the Royal Artillery and Engineers with 50 of the 2nd Battalion of the 2nd Regiment. This force comprising all the remaining healthy men of the Artillery and Engineers both at Ireland and Camp Cunningham.

The "Galatæa" sailed again on the 24th September for Halifax; during, or soon after, the voyage two men of the Royal Engineers died, and a sergeant of the 2nd Battalion of the 2nd Regiment; a gunner also of the Royal Artillery was attacked, but recovered. The whole of the healthy troops remaining belonged to the 2nd Battalion of the 2nd Regiment, and were under canvas at Ferry Point, with the exception of about 30 men, who were left at Boaz to furnish sentries for the dockyard. There was very little cause for anxiety about the troops at Ferry camp, as it was found that nearly all their fever cases had originated at St. George's. The admissions almost ceased there after the 3rd September, so it was determined not to send any more drafts to Halifax unless some extraordinary occasion demanded it.

The troops generally were so healthy at the end of October that five Medical Officers returned to Halifax or Canada. After the 25th September there were scarcely any cases admitted into hospital at St. George's, but the fever seemed still to hang about the town; new comers (especially sailors) were struck down until near the end of September, the type of the disease was unchanged, probably owing to all the latter cases being complicated with drunkenness.

The weather in October and the earlier part of November was cooler than in ordinary seasons, and was considered to have produced a salutary effect. But during the middle of November south winds prevailed, the day time felt close and oppressive; this was followed, on the 20th, by a sudden reappearance of fever cases in the town of St. George's, and at Hamilton, Ireland, and several other places simultaneously. The Governor was also attacked at Mount Langton, which place had hitherto escaped. The last soldier attacked at St. George's was a private of the Army Hospital Corps; this was on the 19th November.

Total treated and died at St. George's.

The total admissions at this Station (St. George's) amounted to 290, and the deaths to 107; to find the proper ratio of deaths to sick, 19 relapse cases must be deducted from the 290 admissions; the ratio is then 39·1 per cent. The ratio of deaths and cases to strength cannot be given, as the men sent in on fatigue duty from Ferry Point and Cunningham were constantly being relieved, and their number varied so greatly.

Progress of the Epidemic at the Camps.

Seven companies of the 2nd Battalion of the 2nd Regiment, on disembarking from the "Orontes" on the 16th July, were encamped at Boaz Island, after sending one company to St. George's, their strength was 12 officers and 406 men. They had double bell tents, and horse hair mattresses, but there was some little delay in the issue of iron bedsteads. The ground was the Bermuda rock which had been levelled by the convicts; the elevation was only a few feet above the level of the sea. The chief drawbacks were the smallness of the camp ground, and the number of buildings in every direction. These were formerly the convict prison-houses, with the warder's quarters, &c. The island is also too close to Ireland Island which is thickly populated by the dockyard establishment. The chief advantage of Boaz is, that it is far removed from any town, so the soldiers have a difficulty in procuring drink. The men of the Royal Artillery and a few Engineers were encamped on the glacis at Ireland Island, two miles from Boaz, and on somewhat higher ground.

The first fever case in the locality appeared in the 2nd Battalion of the 2nd Regiment at Boaz* on the 23rd July, this being the same day that the first case appeared in the right wing of the regiment at St. George's. The man attacked could not have had any communication with any fever case, so the question of contagion is disposed of. Another case appeared next day, the third case after two days.

All the earlier cases were extremely slight, for there was only one death out of the first nineteen. The first death occurred on the 18th August, nearly a month after the earliest attack. No case appeared among the Artillery at Ireland until the 25th August, more than one month after the first case in the 2nd Battalion of the 2nd Regiment, and there was only one death among the first eleven cases.

Thus the unacclimatized men of the 2nd Queen's suffered much earlier than the Royal Artillery, who had been two years in Bermuda. It was considered that many of the earlier cases in the 2nd Battalion of the 2nd Regiment were brought on by exposure to the sun, as the men had to march two miles from their camp to the main guard at Ireland. A small camp of 90 men was therefore formed near the glacis at Ireland, on the 30th August, from which the sentries were furnished for the dockyard. In the beginning of September, and frequently afterwards, as already stated, I requested that the dockyard guard should be discontinued, but the naval storekeeper declared that he had not the power, as he was acting under strict orders from the admiral commanding on this Station. On the 7th September the south-west gale occurred, which had (as I have before mentioned) a decided effect on the disease all over the islands.

The first detachment of the troops (200 of the 2nd Queen's) left Boaz for Halifax on the 10th September. Four days afterwards fever re-appeared in force; Dr. Gallagher, Deputy-Inspector-General of Naval Hospitals, was struck down on the 15th, and died on the 20th September. The epidemic influence had been gradually intensifying for some time past at this western end of the Bermudas; numerous persons of the dockyard establishment were now being seized, many of whom died. I was very anxious that all the remaining healthy men should be quickly withdrawn from Boaz and Ireland Island, but the dockyard guard prevented this being carried out. I urged the abolition of the guard from time to time; as a palliative measure I recommended convalescents to be sent from Ferry Point, and as they became strong enough they did duty on this guard, but, as not very many were sufficiently recovered, recourse was had to healthy men. To my great satisfaction the "Galatæa," on the 24th September, took away to Halifax all the remaining healthy men (200 in number) with the exception of about 30 of the 2nd Queen's, who were left for dockyard duty with the strongest of the convalescents. In a few days' time the disease reached its maximum in the dockyard at Ireland. The officer commanding the troops again urged the abolition of the guard. Seven sentries had been required for the sparyard, naval hospital, and dockyard. At length the number of sentries was gradually reduced; by the 30th September the dockyard sentries had been reduced to two, and on the 1st October they were finally abolished. This guard was the cause of many lives being sacrificed, and it will be seen that, during the epidemic of 1853, a similar loss of life occurred from the same cause. It is to be hoped that the Admiralty Board will devise a remedy in the anticipation of another epidemic season.

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* An artizan in the dockyard, who had not been to St. George's, is said to have been attacked still earlier in Ireland. The history of the epidemic in Ireland has yet to be incorporated; facts are being collected.

A temporary hospital was opened at Boaz on the 3rd October, on account of the Royal Naval Hospital having been closed, as the Medical Officers considered it objectionable to concentrate so many fever cases under one roof. Hitherto all the sick among the troops had been treated in the Naval Hospital.

After the dockyard guard had been discontinued, a few healthy men (non-commissioned officers, servants, &c.) still remained at Boaz, several of whom were attacked. Cases also arrived from the signal-stations at Gibbs' Hill and Mount Langton, until convalescents were sent to those posts to relieve the healthy men. The last case contracted at Boaz was on the 20th October, there having been fierce southerly gales on the previous day, with heavy rain. Out of a strength of 506 men at Boaz and Ireland Islands (including 16 at signal-stations), there were 137 cases of fever, 42 of which were fatal. The ratio of cases to strength is then 27·0 per cent., and of deaths to strength 8·3 per cent; 30·6 per cent. of the cases died. Ten per cent. more of the Artillery were attacked than of the 2nd Battalion 2nd Regiment. This I attribute to the better position of the larger camp of the 2nd Battalion 2nd Regiment at Boaz. The ratio of deaths to cases was, however, greater in the 2nd Battalion 2nd Regiment—an unacclimated corps,—than in the Artillery, the difference being as follows:—2nd Battalion 2nd Regiment, 32·3 per cent. Royal Artillery, 27·2 per cent.

This ratio of mortality to cases was much less than in the portion of the 2nd Battalion 2nd Regiment at St. George's, where it amounted to 47·3 per cent. Eight officers out of 24 were attacked at Boaz, but none died. Seven women were attacked out of 32, and 2 died. Of 40 children, 5 were attacked, and 2 died. The mortality among children has been very small at all stations. The families were living in houses at Boaz, and in the Casemate Barracks, Ireland Island.

The camp at Fort Cunningham.

A camp, composed of 217 of the Royal Artillery and Engineers, was formed, as before mentioned, at Fort Cunningham on Paget's Island between the 16th and 18th August. This island lies at the entrance to St. George's Harbour, about 1¼ miles S.E. from the town. On the highest point there is a small fort, around which the tents were pitched, on ground devoid of bush, and exposed to the north and east winds. When the troops arrived, they must have been saturated with the yellow fever poison, as they had been encamped for about a month in the vicinity of St. George's. This accounts for the number of admissions during the first fortnight. After that period, there was a rapid decrease in the cases. On the 24th September, all the healthy men were sent to Halifax. I considered this step advisable, as some of the men had to proceed to St. George's every day to procure rations, &c., and in this way contracted disease. Sufficient black labour could not be procured for the "fatigue duties" of all the various camps. Up to the 28th August, all the sick from this camp were sent to the General Hospital for treatment.

On the 29th, Staff-Surgeon Clarke opened a temporary hospital, at the above camp, where slight cases were treated; but, after his death, all the sick were again sent to St. George's, on account of the small number of Medical Officers fit for duty. I am of opinion that none of the fever cases originated at this camp, but were contracted, in every instance, at St. George's.

Since the beginning of October, men of different Staff Corps, with their wives and families, were, on their arrival from Halifax, sent to Cunningham for safety. None of them contracted fever, although cases were still appearing in St. George's.

There was a very great difference between the ratios of admissions and deaths in the Artillery and Engineers at Fort Cunningham camp, as the following Table will show:—

Corps.	Strength.	Cases.	Deaths.	Ratio of Cases to Strength.	Ratio of Deaths to Strength.	Ratio of Deaths to Cases.
Royal Artillery ..	115	73	20	63·4	17·3	27·3
Royal Engineers..	153	73	21	47·7	13·7	28·7

Although the mortality among the cases treated was nearly the same, the ratio of admissions and deaths to the strength was much higher in the Artillery than in the Engineers. The circumstances affecting the two corps were apparently the same. They moved from St. George's together, and were encamped side by side. But the habits of the men were somewhat different, for, owing to the Engineers getting larger pay, they no doubt drank the more, and, in many instances, to excess. The officer commanding stated to me, after the epidemic, that, to his surprise, all the systematic hard drinkers were alive, and that the steadiest men were gone. This sad fact has been remarked during former epidemics in Bermuda. Two officers died at Cunningham, but both had been constantly in St. George's, and, no doubt, contracted fever there.

The camp at Ferry Point.

The advantages of this site have already been detailed. The absence of houses, trees, and bush ensured a thorough circulation of untainted sea-atmosphere. There were no cess-pits. Privies were constructed over the sea, and the soil was at all times swept away by the tide. The Medical Officers paid very great attention to the general sanitary state of the camp. The men were frequently inspected, and care was taken to keep them from exposure to the sun. A variety of games and amusements were introduced, which cheered their spirits. A proper check was established over the canteen, and there was little opportunity of obtaining spirituous liquors elsewhere. When the head-quarters of the 2nd Battalion 2nd Regiment arrived at this camp on the 1st August, the men were suffering more or less from blood-poisoning, as they had been inhaling a pestilential atmosphere for a fortnight. Already 17 cases had shown themselves, 2 of which had proved fatal. In addition to this source of sickness, men were constantly being sent to St. George's for general fatigue duty, and were either struck down while so employed, or returned to Ferry Point to be admitted, perhaps, in a few days into the camp-hospital.

This state of affairs lasted until the 3rd September, by which time sufficient coloured men had been obtained to obviate the necessity of any of the troops leaving their camp. After this date very few cases appeared, and only three deaths occurred, in each instance the soldier having been a short time previously in St. George's. On enquiry it was found, by Dr. Killery, that the whole of the 17 men who died had been, a few days previously, in St. George's. After the epidemic, the convalescents were paraded and questioned, when it appeared that out of 61 cases, only 7 had, in all probability, originated at Ferry Point. Only one officer out of 10 was attacked, and he had been continually visiting St. George's. The officers who kept to the camp never contracted fever.

The civil practitioners in St. George's are of the same opinion as myself regarding the salubrity of Ferry Point, and declare it proved equally healthy during former epidemics. In 1853, the authorities seem to have considered the site unhealthy, and, as several fever cases and deaths occurred, they removed the troops to a camp on Prospect Hill. There is every probability, however, that these cases originated at St. George's, for I find that the same system of sending in fatigue parties for duty in the town was pursued as during the present epidemic.

A question may arise whether it would not be advantageous to build barracks on this healthy site. I should say it would not, for, directly buildings are collected together, the advantages of the locality are almost lost. In all places subject to yellow fever it is sure to be occasionally found in any barracks, however eligibly situated, unless built at an elevation above the sea, such as cannot be found in Bermuda. I would therefore recommend this ground to be kept clear of houses or bush, so as to be unpolluted and available for the formation of a camp at any moment. Certain buildings should, however, be erected at some short distance, such as a small hospital, commissariat and purveyor's stores and offices, also a bakery. A good site can be found for such on the higher rocky ground to the north of the peninsula.

Camp at Walsingham.

Ten men of the Royal Engineers were encamped at Walsingham, a village on the mainland, three miles south of Ferry Point, having been sent there in the summer to "quarry" stone. Five of the party were attacked, and one died.

The last case among the troops was that of the Serjeant-Major of the 2nd Battalion 2nd Regiment, who contracted fever on the 10th December, at Hamilton, about five months after the earliest seizure.

Total mortality among the military.

It is shown that the total loss of life, in all corps, amounted to 14 officers, 173 men, 5 women, and 4 children. The mortality, proportionately, was far greater among the officers and men than among the women, and least of all among the children.

The strength of the officers being 74, and the deaths 14, the ratio of deaths to strength was 18·9 per cent. With the men it amounted to 14·9 per cent. About a third of the cases of both officers and men ended fatally. The ratio of deaths to strength varied a good deal in different corps. In the Artillery it was 13·8 per cent.; in the 2nd Battalion 2nd Regiment, 14·8; and in the Engineers 15·7. In St. George's, the 2nd Battalion 2nd Regiment lost far more heavily than other corps, but their move to Ferry Camp saved so many lives that their total loss affords a smaller ratio than that of the Engineers.

To fully understand the deadly influence the atmosphere of St. George's had upon the men of the 2nd Battalion 2nd Regiment, I have traced the history of the 56 men left behind on the 1st August, when the head-quarters marched to Ferry Point, and also of other 87 men afterwards sent into St. George's on "fatigue." Of this body of 143 men, 103 contracted fever, and 55 died, or 38·4 per cent. of the strength. It is impossible to compare satisfactorily the ratios of disease and mortality of one corps with another, as the circumstances affecting each differed so greatly. Medical Officers are agreed that the later cases of fever did not show the same degree of malignancy as during the height of the epidemic. In 1853, no change in this respect was observed, even to the very last case.

Mortality amongst the merchant seamen.

The mortality among the sailors in St. George's was very nearly the same as with the troops; but the disease continued longer in the town, cases appearing to the end of December. This is accounted for by the constant arrival of fresh crews, and by all the healthy soldiers having been removed to the camp. A fever hospital was opened at Pendle Hill on the 8th August. Up to the 31st October, 124 patients (mostly sailors) were admitted, 43 of whom died. Pendle Hill is about one mile and a-half south-west of the town.

At Hamilton, the disease did not show the same malignancy as at St. George's. This would be expected from the more open position of the town, and from the houses being less overcrowded. Dr. P. Tucker informed me that, of 73 Europeans and foreigners he attended at Hamilton, 16 died; while of 75 natives (white), only 1 died. He also stated that the first case appeared there on or about the 1st August,* the disease having been contracted in St. George's. It will be some months before a return can be made out of the number of the civil population who were attacked. The coloured people have suffered in some districts to a considerable extent; but the mortality was small. It is recorded that they suffered quite as much as the whites during the 1856 epidemic. This, however, is an extremely rare occurrence.

It is difficult to explain why the troops suffered so little loss in 1856. Dr. Gavin Milroy believes it was owing to the wise precautions taken on the part of the military authorities; but that scarcely explains it when we compare the state of health of the troops near St. George's (over 800) with that of the town, which was in its usual condition of filth and squalor. In the town there were only three cases, and the troops suffered to exactly the same extent. The vagaries of yellow fever, as of cholera, are at times quite inexplicable.

In 1856 it first broke out in Somerset, near a salt-lake; but very soon seized upon the convict hulks at Ireland and Boaz Islands. In former epidemics it almost invariably attacked the hulks in the first instance, and then spread to the towns. The hulks were certainly in the worst sanitary condition; they were "moored" close to the shore, generally embedded in the mud at low tide, with refuse matter in a state of decomposition floating about in their vicinity. Inside their state was far worse; the atmosphere between decks must have been almost unbearable in hot weather, considering their over-crowded condition, and that the lower timber of these "worn out" ships, acted upon by the bilge water probably for many years, must have been more or less rotten, so that vegetable decomposition was constantly in action. Now that the hulks are unused, fever selects its next most suitable home in towns, and in St. George's it finds in a state of concentration every element it delights in, as has been too surely proved during the last six months.

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* An inquiry is now going on at Hamilton as to the facts connected with the earlier cases.

Before many years pass away another epidemic will certainly visit St. George's, unless the townspeople are roused from their state of apathy and indifference. I believe that nothing but a great pressure on the part of the Home Authorities will remedy the present state of affairs. Unfortunately, on account of the large number of fortified posts around St. George's, a considerable military force must necessarily be quartered in the neighbourhood. An epidemic outbreak in the town is, therefore, tolerably certain to extend to the troops, and thus become a matter of serious importance to the British Government. The first thing required is a proper system of sewerage. I have before stated that there is an utter absence of sewers both in St. George's and Hamilton. The first outlay for this purpose would be great, without doubt; but a loan might be raised, and its payment extended over a number of years. It is always asserted by the inhabitants that yellow fever has been invariably introduced into the Bermudas; but every Commission, after a very close examination into facts, has declared that the fever originated in the islands. It would appear to the unprofessional man that the disease in the first case (Alton's) had been contracted in Nassau, sixteen days only having elapsed after his leaving that island, when yellow fever symptoms set in; but sixteen days is a long period of incubation, far longer than the ordinary limit. Five Medical Officers arrived from Halifax at the end of August, and proceeded to St. George's. They were supplied with three soldier servants from the camp at Ferry Point; the whole eight contracted fever within eight days, the majority being seized on the fifth. I myself was seized on the fourth day, and was the first attacked. It was also clearly proved that Alton had been suffering during the voyage, and afterwards from intermittent fever of the tertian type for a period of at least sixteen days. It is contrary to all medical experience that an individual can contract two acute diseases at the same time, one remaining in the system in a state of incubation for a lengthened period, although there are cases known where (during an epidemic when the influence is strong) an intermittent has suddenly merged into yellow fever. It has been noticed, that whenever an epidemic breaks out in Bermuda, the disease has been found at the same time on the North American coast, and I have no doubt that the epidemic influence extends over vast distances. There is, however, in the Bermudas every essential condition (as far as we know) necessary for the generation of hœmagastric fever, such as geographical position, the proper temperature and degree of moisture, and a susceptible population. The disease seems to obey certain laws as to the frequency of its appearance in different countries; some it visits, with an approach to regularity, about every three years, others every five, Bermuda every ten years, with perhaps an intermediate milder visitation. This looks as if the development were not owing to accidental causes, and is against the theory of importation. Then as to the season of the year, there is a remarkable regularity in regard to the time of commencement of the various outbreaks of fever in these islands. I think I may say there has never been, since 1837, a variation of more than twenty days, the beginning of July being the ordinary starting point. This also is surely evidence against the importation theory. Again, in how many instances do ships, with yellow fever cases on board, touch at sea-ports, and even land persons suffering from the disease, without its spreading? This frequently happened in Jamaica during my period of service at that Station. The amount of negative evidence is so great, that it would appear as if it were only a coincidence in the few cases where the disease was apparently introduced. An epidemic visitation of yellow fever seems to bear a certain resemblance to a thunderstorm in summer, when there is a gradual accumulation of electricity in the atmosphere until at last the clouds become so overcharged with the electric fluid in opposite states, that an equilibrium takes place, accompanied by violent explosions, after which there is a state of perfect calm. So, after an epidemic, all susceptible people having been cut off, or at least attacked, the explosion is followed by a calm. In course of time the young grow up; new comers, with fresh blood, are constantly arriving; the sanitary condition of the country and towns, which had perhaps been improved during the outbreak, again becomes neglected; the essential conditions of the atmosphere and the soil whatever they may be (and very probably electricity is largely implicated) have been gradually gaining force until at length, after a preliminary warning, the explosion takes place, and an epidemic breaks out in full force.

These islands are subject, at long intervals, to epidemic visitations of a disease, vulgarly called "broken bone fever." It is an ephemeral fever, lasting only a few days, and appears, in some respects, to be allied to yellow fever. There is the same peculiar headache and severe pain in the loins, with distressing aching pains in all the limbs. Convalescence also is very slow, as in yellow fever. I cannot find that the urine has ever been analyzed, to determine the presence of albumen. The bodily sufferings are very great from this fever; but, as nobody dies of it, the natives believe it originates in the islands, and is not contagious! Very probably these epidemic visitations keep off for a time outbreaks of hœmagastric fever. Broken bone fever is found also on the North American coast.

The Fever of 1864 bears a striking resemblance to that described in the outbreak of 1853, and would come very nearly under Aitken's definition of specific yellow fever, except that I have seen nothing to satisfy me of its contagiousness. At the onset of the epidemic there was a tendency to remissions; but, after a short time, all the cases were of a purely continued type. I have already remarked upon the peculiarity of the first case (Alton's), where a decided intermittent changed its type to hœmagastric fever, the man dying with black vomit.

This is not uncommon in Jamaica (where paroxysmal fevers abound), and is most noticeable when an epidemic is on the decline; but I wish now to remark upon another fact which I have observed in several instances, both here and in the West Indies. It is the peculiar liability of persons suffering from severe injuries to attacks of yellow fever. A young sailor, at the close of the epidemic, fell from a ship's rigging; on being examined, a compound fracture of one leg was discovered, with other injuries. Symptomatic fever set in, which soon merged into yellow fever, and the lad died with black vomit. Mr. Lawson, Deputy Inspector-General of Hospitals, witnessed several such cases in Jamaica in 1857, and brought the fact to my notice. It was found in the same year that any disease attended by pyrexia was very liable to end fatally with black vomit. It must be stated that this was towards the subsidence of the epidemic. I am of opinion that an excited state of the circulation, from any cause, predisposes to the disease, even if produced by violent exercise, undue exposure to the sun's rays, excessive drinking, &c. It is possible that the excited state of the heart during the latter months of pregnancy may account for the liability to attacks of women in that condition. It may be laid down as an axiom that all disease during an epidemic of this fever has a strong tendency to assume the hœmagastric type. This is proved by the absence of other diseases, until the epidemic influence is on the decline, when venereal and other affections immediately reappear. I have never met with the Paludal form described by Professor Aitken. Although salt marshes abound towards the centre of the Bermudas, yellow fever has only once been known to originate in their vicinity, and that was in 1856. At other times it first appeared either at St. George's or Ireland Island (the extreme east and west), where no marsh land is to be found. Aitken describes five types of the disease, the algid, sthenic, hœmorrhagic, purpuric, and the typhous. The two latter, I think, might be included in one, and an asthenic type might be added. No case of the algid type was witnessed during the epidemic.

Symptoms presented by the Fever.

Symptoms of dyspepsia generally preceded an attack for one or two days; there was a loss of appetite, white tongue, a feeling of langour, sometimes diarrhœa was present, or slight flushes of heat were complained of. This state was followed by headache, pain in the back and limbs, slight shiverings, lasting perhaps not more than half an hour, or they varied in degree until they became actual rigors, which continued for several hours. This stage mostly set in about daybreak, then followed the hot stage. The skin would be hot and dry, the eyes suffused, and having a peculiar "ferrety" appearance; severe pain in the eye-balls and in the loins; pulse from 90 to 120, or more, full, but compressible; nausea, or bilious vomiting; tongue white and creamy, but with crimson tip and margin, indented by the teeth; the under surface of the tongue, and the mucous lining of the cheeks, lips, and soft palate were of the same brilliant colour, showing intense gastric implication; stools, at first, bilious, then gradually getting lighter coloured, until, at length, they became almost white; urine, at first, acid, in diminished quantity, soon getting either straw-coloured from bile, or smoky red from the presence of blood globules. At the end of the third day, or the beginning of the fourth, there was a great decrease of the chlorides, and albumen was always present in the urine, generally in large quantities. On the fourth day, a sediment was thrown down, consisting of mucous epithelium, and granular tube casts from the kidneys. The hot stage rarely lasted long. Diaphoresis was generally established in from four to twelve hours, and then became profuse, but gave no relief to the symptoms, the actual heat of the skin remained unchanged, the temperature ranging from 100° to 103°. I find 103° was the maximum temperature registered by Dr. Gandet in 1856. A very minute papular subcutaneous rash, something like prickly heat, was observed in many cases, especially after the use of the warm-bath. A burning sensation at the epigastrium was commonly present, actual pain being complained of on pressure. In some cases the fever would subside in twenty-four hours, and the patient make a slow recovery. In others it would continue for four or five days, when the skin would recover its natural condition as regards temperature, the conjunctivæ would become yellow, and perhaps the skin also; albumen would disappear from the urine, and the chlorides return, as well as the bile in the stools, and a very tedious recovery would follow. But perhaps on the third, fourth, or fifth day, fever might subside, and the patient seem to be progressing most favourably, when an irritable state of the stomach would appear, vomiting become frequent, the ejecta consisting at first of the drinks, next a clear acid fluid would be seen, containing brown flocculi (white vomit), accompanied by a sense of burning in the epigastrium. This might continue for some hours, when a sudden discharge of black vomit would take place, either with or without convulsions, and the patient rapidly die. Prognosis, therefore, must be exceedingly "guarded" in this disease. When plethoric persons were gravely attacked (and they seemed the most liable), the countenance presented a bloated and livid appearance; such cases were very apt to assume the typhous form,—the tongue would soon get dark-brown in the centre, occasionally in transverse stripes, although, in time, the whole tongue would be of the same dark colour and dry. This was a very dangerous symptom. The most fatal symptom was suppression of urine, which generally commenced on the fourth day. Almost as fatal was the appearance of black vomit, and I believe no case recovered where it was present in any considerable quantity, although one or two men did recover who ejected it in very small quantities, or who passed it away by stool. Where much black vomit had been seen, death seemed to have occurred from syncope. In cases where there was a total suppression of urine, death took place from uræmic poisoning of the blood, and there was delirium and convulsions, with coma. The greatest danger was when the pyrexia subsided, and the stage of prostration set in. According also to the length of the stage of pyrexia, so was the danger. In the typhous form an oozing of dark blood was occasionally seen from different mucous surfaces; it was observed most frequently in the form of epistaxis, next from the gums, rarely from the ears or eyes. The three latter are most dangerous symptoms. The hœmorrhagic tendency was very great in some cases. A man had a small suppurating boil on the lobe of one ear, an oozing of blood took place, and in this way several pints were lost; the hœmorrhage was at length stopped by digital pressure, which had to be applied day and night without cessation. The man miraculously recovered. The white creamy appearance of the tongue was not always seen. In a few cases it was unnaturally red and glazed from the commencement, or covered with a brown fur. The redness of the edges and underneath was all but universal. There was always danger to be apprehended when much anxiety or great restlessness was seen. The following were all symptoms of danger.—A fiery red and dry tongue, an exceedingly irritable stomach, or great looseness of the bowels, with very dark stools; shreds of epithelium passed by stool; early suppression of urine, or traces of black vomit; a flagging of the capillary circulation of the skin; an early appearance of yellowness of the surface; a small frequent pulse on the subsidence of fever. Yellowness of the skin was present in perhaps one-third of the cases during life; but it was always visible after death. Some degree of yellowness of the conjunctivæ could always be detected on the third or fourth day. The yellowness of the skin depends, I believe, on the blood changes, and not from the deposition of bile.

John Hunter truly says that in this fever there is death of the blood; the blood globules seem to be in a state of disintegration even before death. We know that urea in the blood is converted by metamorphosis into a carbonate of ammonia. It is probable that the action of the ammonia on the blood in the capillaries produces the appearance of yellowness of the skin. Dr. Richardson states that ammonia absorbed into the circulation renders the blood too thin, and causes an irregularity of the blood corpuscles, and that, if absorbed in large quantities, it may cause suppression of the biliary secretion, as well as yellowness of the skin. In the typhous form, large patches of ecchymosis made their appearance, sometimes before, but always rapidly after death, especially on the inside of the arms and legs, and the most dependent parts of the body. A peculiar odour has often been remarked as emanating from the bodies of yellow fever patients. I believe it depends upon the elimination of ammonia from the skin, as well as from the lungs. Blood in the urine may not be altogether unfavourable, as it tends to relieve the congested state of the kidneys. The granular tube casts show a secretion from a diseased structure. Bile was seen commonly in the urine about the third day, and was not an unfavourable symptom. When there was much of the "inky black" vomit, looking like coffee grounds, the intellect remained clear; but convulsions frequently came on just before death. They were at times violent, and in one case lasted several hours. Exudation of blood from the gums relieved the swollen state of the tongue, which then presented the appearance seen in typhus fever. Although black vomit may not be ejected, it may still be found after death in many instances both in the stomach and bowels. Black vomit was present in more than two-thirds of the fatal cases. The fifth was the most fatal day.

Relapses. There were 27 relapses out of 510 cases, 483 men were attacked so the ratio was 5·59 per cent. of relapses to men attacked. Of the relapses 37·03 per cent. died. Relapses were nearly always brought on by imprudence in eating. The congested state of the mucous coat of the stomach no doubt disappeared very slowly; any solid food introduced into that viscus was liable to create intense irritation of the mucous membrane, fever was re-established of a low type, accompanied by distressing vomiting, which quickly assumed the character of black vomit, and death ensued. One lingering case was followed by ulceration of Peyer's glands and perforation of the intestine, which, however, became glued to the abdominal parietes by means of adhesive inflammation; long and tortuous sinuses formed; abscesses pointed in the left groin and thigh; on being opened fœcal matter was seen mixed up with unhealthy pus, and the man died from exhaustion. On post mortem examination, the mucous coat of the stomach was still congested in patches, although more than a month had passed away since the subsidence of the fever. Furuncles were frequently observed during convalescence, they discharged a thin unhealthy looking pus and were a long time in healing up, as reparative action was exceedingly slow.

Convalescence. Convalescence was very protracted in all cases; this I attribute chiefly to the weakened state of the digestive apparatus. Some weeks were required for the stomach to recover a healthy tone, and when we consider the diseased state of the mucous membrane, always congested, and occasionally denuded of the epithelium, it is not to be wondered at.

Second attacks. Two only of the military (a Commissariat officer and a sergeant of the Army Hospital Corps) had been attacked by yellow fever previous to this epidemic; they both escaped a fatal issue on this occasion.

Acclimatization. Europeans who have long resided in hot climates show it by their sallow anœmic complexions, flabby muscles, and inability for severe labour. The blood becomes attenuated, the red globules are deficient, and the system is non-inflammatory. We are too apt to look upon this as a state of disease, although it is not so in most cases, but merely a wise provision of nature to adapt the constitution to the peculiarities of climate, the chief being the decreased heat demand upon the system.

It takes many years for the system to accommodate itself thoroughly to the change from a temperate to a tropical climate, as this really is in summer. In Jamaica physicians declare that a residence of from twelve to sixteen years is required before immunity from attacks of yellow fever can be expected, or at all relied on. The Artillery and Engineers had been quartered (on an average) about two years in Bermuda, and they were so differently circumstanced with respect to the newly arrived Line Regiment that no great value would result from comparing the ratio of attacks and mortality.

Corps.	Strength.	Admissions.	Deaths.	Ratio per cent. of Admissions to Strength.	Ratio per cent. of Deaths to Strength.	Ratio per cent. of Deaths to Admissions.
Rl. Artillery and Engineers...	387	201	57	51·9	14·7	28·3
2nd Batn., 2nd Regiment. ..	755	292	112	38·6	14·8	38·3

The ratio of admissions it will be seen is much higher in the Artillery and Engineers than in the 2nd Queen's, and this results partially from the Royal Artillery and Engineers having been kept so much longer in the close vicinity of St. George's, and partly from the fact that, when they were removed, their camps at Cunningham and Ireland were less favourably situated than those of the 2nd Battalion of the 2nd Regiment at Boaz and Ferry Point.

I have before alluded to the circumstance of confirmed drunkards being less liable to attacks of this fever than more sober men. Hard drinkers of spirituous liquors are generally somewhat anœmic, as they suffer from depraved appetites, and consequently do not consume a sufficient quantity of nourishing food, this may account for their system becoming somewhat non-inflammatory. The majority of the unfortunate men who (perhaps from fear) took suddenly to drinking to excess were quickly prostrated with fever, and died in large numbers. This accounts also for the excessive mortality among the sailors in the town at the close of the epidemic, I believe not one of the last eight cases recovered, all these men were in a state more or less approaching to delirium tremens, when seized by the disease. The latter cases among the troops certainly assumed a milder type.

On making inquiries I can only discover five women who were in a pregnant condition, and they all contracted fever. In two cases artificial labour was induced ; in the first, the woman was in the eighth month of pregnancy, both she and the infant died : in the second case, the mother (who was in her ninth month) recovered, but the infants (twins) died in forty-eight hours. The three other women recovered, and healthy children were born at the proper time.

Contagion.

The strongest argument against the theory of contagion is found, in my opinion, in the immense mass of negative evidence ; the innumerable instances in which yellow fever cases are introduced by shipping into healthy localities in the proper fever zone without spreading disease. I have seen many instances, and all writers on the disease testify to the same fact. This certainly does not quite prove non-contagion, but it does very nearly ; the disease at all events can only be very slightly communicable, if at all. Sir W. Reid considered that it might, perhaps, be contagious in a temperate climate, although not in a tropical, but confessed he was staggered when he found yellow fever cases were constantly being taken up the Mississippi in steamers from New Orleans, and landed at towns and villages on either bank, without ever spreading the affection. The progress of the disease gives to me anything but the impression of contagion ; we see slight febrile attacks gradually increasing in severity until malignant yellow fever bursts forth—this is not the history of a contagious disease. If it be so, why does it lose this property away from the sea-shore? Why does it not appear in Bermuda at other seasons than the autumn? why never in May, but always in August? How is it that it disappears always at the same time? Has any other contagious disease such special and systematic peculiarities? Many circumstances affording evidence against contagion were remarked, such as the history of the appearance of fever in the Civil and Military Prisons. The fact of the first cases in the right and left wings of the 2nd Battalion of the 2nd Regiment appearing on the same day, without any communication between the two bodies of men, the left wing on disembarking having landed at Boaz, and the right wing at St. George's. The two Medical Officers who kept strictly to the camp at Ferry Point escaped an attack, although daily in close communication with the sick and dying, the third Medical Officer certainly did get fever and died, but he was almost daily in the poisonous atmosphere of St. George's. Again, hospital orderlies at St. George's were attacked in a somewhat smaller ratio than the officers, in or near the town. All this testimony bears strongly against contagion, but on the other hand there is abundance of evidence, as to the marked effect both local and atmospheric influences exercise over the course of the disease, which I think satisfactorily accounts for both the intensity shown at certain points and the spread of the fever. First, as to the effect of atmospheric influences, it is on record that during several epidemics the disease has been proved to appear simultaneously at far distant places; I have already remarked upon the extraordinary re-appearance of fever cases on the 19th and 20th November, at a time the disease was supposed to have died out owing to a short season of very unusual cool weather having set in. A sudden change of wind to the south brought back a sultry moist atmosphere, when many fresh cases were immediately developed. Dr. Hilditch, Deputy Inspector-General of Hospitals, R.N., remarked the same circumstance in 1853; he stated that the increased heat and humidity following south winds not only raised the number of admissions, but aggravated the symptoms of the cases previously taken into hospital. Mr. Lawson, Deputy Inspector-General, observed that a heavy fall of rain invariably had a marked effect in checking the development of cases in Jamaica during the 1856-7 epidemic. I have mentioned several instances where heavy rain had the same effect in 1864. As the weather became colder the cases became gradually less numerous; the last case at Ireland occurred on the 10th December, but at St. George's as late as the 5th January. Cold weather does not have the same effect on variola.

Local influences.

Then as to the weight of local influences—how is it that a change of locality always produces an alteration in the phase of the disease, and constantly has the effect of stopping the further development? The fever very quickly subsided at the Ferry Point Camp when the men were not allowed to enter St. George's. The local influences of the town must, indeed, have been strong when I am able to state that, out of 30 officers living in the neighbourhood, 29 contracted fever and 14 died. The officer who escaped fever had had an attack of some severity in the West Indies, which protected him on this occasion. Twenty-two of those officers had been living in houses of which the sanitary state was more or less faulty. There was a great deal of sickness in the Line officers' quarters to the east of the Royal Barracks, the same fact was observable in the 1853 epidemic, and it would be expected from the faulty principle on which they have been constructed. This I described in the beginning of the report under the heading, "Military Stations." Eight officers lived in these quarters; all contracted fever and three died. Two officers' wives were attacked but recovered. Fifteen soldiers were employed as servants during the outbreak, none escaped fever, and seven died. They nearly all slept in tents pitched to the rear of the quarters, two or three slept in back rooms on the ground floor, none slept in the kitchen under the officers' quarters. Of two children one was attacked; one nurse escaped altogether. Thus of 28 individuals, 26 were prostrated with fever, and 10 died. Only an infant and nurse escaped a seizure. Let us now examine the cases where families were attacked. Close to the right rear of the officers' quarters there are three cottages, very badly placed in a sanitary point of view. The officers' and women's privies (cess-pits) are quite close to the first cottage, in the front of it are the Engineers' wood sheds, and to the rear almost touching the house is a dense forest of cedar trees, no breeze can enter the house except what finds its way from the south and passing over the privies. The two rooms are very small, and badly ventilated, the floors being below the level of the road in the front of the house. There is also an objectionable water-tank close to the house. A staff sergeant, Mellis, wife, two children and coloured nurse lived in the two rooms. One child was seized on the 10th August, the father on the 22nd; the other child on the 5th November. The sergeant died, but the children recovered; the wife and nurse escaped. In 1853 there was a severe case in the same house, but no death; the number of inmates in that year I am unable to find out. The second cottage is close to the north of Mellis's, and subject to the same influences, but in addition there is a privy close to its rear, as well as a tank. This house is of modern construction, and the rooms are more airy than Mellis's, but the sanitary defects are still very glaring. A sergeant, McIntyre, of the Royal Engineers, wife and one child, as well as a sergeant, McCallum, lived in the cottage. The child was first attacked and recovered, Sergant McIntyre was seized five days after the child, and died, his wife and Sergeant McCallum were seized the day after McIntyre; the woman died and the sergeant recovered. The third cottage is but a little to the north of McIntyre's, the general position is the same as that of the other two, but there is a high wall close to the rear, a tank far too near to the south, a privy eighteen yards to the north; no air can easily enter the house either at the front or at the rear; inside the roof was low and the rooms felt damp, from the proximity to the water tank; nine people slept in the three rooms, a barrack sergeant, Peggie, wife, coloured nurse, and six children. Four children were first seized, on the 9th, 10th, 14th, and 20th August, then Mrs. Peggie, and lastly the two remaining children, the sergeant and nurse escaped; all who were attacked recovered. The local influences were very strong, but yet these families escaped better than the officers. It will be remarked how very susceptible the children were of contracting the fever; the whole nine were seized but not one died. In 1853, a sergeant, his wife and two grown up daughters were living in the third cottage, they escaped, having suffered from the fever of 1843. A house occupied by Mr. Knight, first clerk of the works, was notorious for the number of cases originating in it. It lies to the south of the Royal Artillery Mess-house, but at a much lower level, and facing the south-west, behind, the land rises very abruptly to the height of about forty feet, to the rear of the commandant's quarters, so north winds are completely shut out, the land also receives the drainage from the heights above; there is a water-tank close to the north of the house, the privy (cess-pit) is at some little distance to the west; there are five rooms on the ground floor, with rather low ceilings, and three sleeping-rooms on the first floor, which are said to be intolerably hot in summer, as the abrupt hill to the rear prevents a thorough circulation of air. Mr. and Mrs. Knight and four children slept on the first floor. On the 1st August a child was attacked, on the 3rd another child, on the 19th the mother and two children, and on the 21st Mr. Knight was seized. None of them died, but not one escaped fever. I find that in 1853 a clerk of the works, his wife and two children died in this house, and that five other children were prostrated but recovered; not one person escaping fever. The 2nd clerk of the works lived in a house exactly opposite the Royal Artillery Mess, but at a somewhat lower level. The rooms had low ceilings and were badly ventilated; there was an untrapped sink close outside a bedroom, it led to the cess-pit under a scarped rock, about twenty feet below the house; but worst of all there was a large water tank under the flooring of the entire house, it was no wonder that the rooms felt damp, and that no one escaped fever. Mrs. Patterson was first attacked on the 10th August, one child on the 15th, then two children on the 17th, and Mr. Patterson on the 20th, both he and his wife died, but the children recovered. A foreman of masons and his wife lived in this house during the 1853 epidemic, both contracted fever, but recovered, they had no children. The chief warder's house proved to be the abode of the pestilence in a malignant form; it is situated close to the north of the Military Prison and a short distance from the privies, there is also a stable in far too close proximity, the odours from which are very offensive in summer; but the chief source of danger is a rain-water tank which is placed under the flooring of the entrance passage at the rear of the house. There is one good-sized room on this floor; the ceiling is, however, somewhat low. A son of Mr. Lomer's, aged seventeen, slept in this room and died on the 29th August. Up stairs are two good rooms, in the front one Mr. and Mrs. Lomer, and two children slept, and in the back room a woman and three children. Four children were seized on the 7th, 10th, 11th, and 12th August, next Mrs. Lomer, on the 14th, Mr. Lomer, on the 15th, the eldest son on the 17th, lastly the woman and sixth child. The chief warder and his eldest son died, the others recovered. A chief warder, Smith, and his wife died in this house in the 1853 epidemic, they had only one child, an infant, who escaped. Thus all these houses contained ample local causes to account for the excessive sickness and mortality, and as they fared as badly in 1853 as on the present occasion, the evidence is against contagion. The children and the women were the first attacked, generally, this also bears slightly against contagion as they (as a rule) keep more at home than the men. It may be said that, as almost every one living in these houses was attacked, the evidence was yet in favour of contagion. This can be answered by comparing the sickness in families with that among the officers, each of whom had at least one room to himself. All the 29 officers living in the vicinity were prostrated, one only escaped who had suffered during a former epidemic.

Hospital orderlies.

Let us now see to what extent the orderlies who were attending fever cases suffered. In a return it is stated that, of 34 orderlies employed at St. George's General Hospital, 30 were attacked, and 18 died. The ratio of attacks to strength was less than among the officers near St. George's, but the ratio of deaths to strength was somewhat larger, and amounted to 52·9 per cent. When we consider the vitiated atmosphere these orderlies were constantly inhaling, loaded with organic matter and putrescent gases, the want of regular sleep, the anxiety, and the over-excitement they were suffering from, the only wonder is that the death-rate was not higher. Most of the orderlies slept in tents, which probably accounts for the ratio of seizures being rather less than with the officers. At the Camp Hospital, Ferry Point, only 4 orderlies out of 34 were attacked, and none died. At the Royal Naval Hospital, the admissions and deaths of orderlies were nearly the same as at the General Hospital, St. George's; but I am not acquainted with the peculiar circumstances which may have affected the ratios.

Quarantine.

The Commissioners appointed, in 1857, to enquire into the causes of the outbreak in the previous year determined that the disease originated in the colony, was non-contagious, but diffused by an epidemic constitution of the atmosphere, exploding in attacks of yellow fever where it encountered other necessary elements,—as predisposition in individuals, bad sanitary conditions in localities, or both combined. They therefore recommended that quarantine should still be applied to ships, but to ships as infected localities only—that is, any vessel having yellow fever cases on board should be herself placed in quarantine, but her crew allowed to depart. The vessel should be then cleared out, cleansed, whitewashed and ventilated, &c. This is exactly my opinion on the subject of quarantine. When a supposed case of contagion is brought forward, the question is to determine how much depends upon the local and how much upon the personal cause; and the difficulty in wholly eliminating the local influences is so great that the exact value of the personal can scarcely be estimated, and thus the argument seems likely to go on *ad infinitum*.

Medical treatment.

Active interference has been found to be positively injurious in most cases. The principle of treatment during this epidemic was to pay every attention to the state of the skin in the way of promoting a free action, and to carefully watch the stomach or renal symptoms, and to treat them promptly as soon as they appeared, at the same time supporting the system, when the stage of prostration set in, by administering stimulants and food in a liquid form, in very small quantities, frequently repeated.

When a case was seen at the onset, an emetic of ipecacuanha was generally given, followed by a warm bath or pediluvia. An effort to "abort" the attack, after Blair's system, was made in several cases; 10 grains of calomel and 12 of quinine were thus usually given. This seemed to answer in my own case, but so signally failed in many others that this treatment was discontinued. A mild purgative was given soon after the emetic, either of rhubarb, castor-oil, or in the shape of pills of colocynth and blue pill. Strong purgatives seemed to irritate the whole of the intestinal tube. In some cases, the diarrhœa ended in a discharge similar in appearance to black vomit. Small doses of seidlitz were prescribed in some cases, and allayed the irritability of the stomach. This symptom, however, was tolerably manageable during the hot stage. A mustard poultice seemed to be most efficacious, but had occasionally to be repeated. Cold to the head gave great relief to the distressing pain which was so common in the eye-balls. The pain in the loins was always alleviated by stimulating embrocations. This pain was, no doubt, frequently owing to the congested state of the kidneys, when hot water afforded much relief. Cupping over the loins was made use of in some cases. Great care was necessary, however, for, in the hæmorrhagic form of the disease, death might ensue from loss of blood. On the subsidence of the pyrexia, the period of danger occurred; now suppression of urine had to be watched for. Where there seemed to be danger of it diuretics, as Liq: Ammon: Acet:, Liq: Potassæ, Potas: Acet: Spir: Æth: Nit:, &c., were cautiously prescribed, and fomentations and sinapisms were applied to the loins &c. At this period epigastric tenderness was sought for, and liquid food was administered in very small quantities, either in the shape of beef-tea, chicken-broth, or milk, with, perhaps, the addition of a few drops of brandy. When there was a hæmorrhagic discharge "per anum," turpentine enemata seemed to be useful. In a few cases, champagne was given in the latter stage of the disease; but I believe the carbonic acid gas irritates the stomach when the mucous membrane is greatly congested by the mechanical dilatation which ensues. All heroic treatment was positively injurious. Some of the private practitioners thought they were more successful in their treatment than their neighbours, but it was in localities where the disease did not show much malignancy. In St. George's, the mortality was the same everywhere.

For about the first six weeks quinine was given, as a prophylactic, twice a-day to the troops in three-grain doses, but it was discontinued, as it seemed of no value.

Post-mortem examinations.

All the usual appearances were observed on making post-mortem examinations. The connective tissue was universally surcharged with blood. Where there had been coma, the membranes of the brain were more or less congested. On slicing the hemispheres, the red points were unusually numerous. Yellow serum was found in the ventricles. The lungs were generally healthy in appearance, but were occasionally seen to be congested in the typhous form of the disease. Yellow serum was found in the pericardium at times. The heart appeared softened, and was mostly distended with dark thin blood: in one a coagulation of lymph was seen; in another, large coagula extending into the pulmonary artery. The appearance of the liver varied greatly: in some instances it appeared healthy, or it was of an amber or olive colour, or it presented a nutmeg appearance; occasionally it was fatty. The gall-bladder was mostly half full of thick, dark-green bile. The stomach was contracted, its mucous membrane rugose and softened, congested in patches, occasionally, of a deep brown colour. The contents of the stomach varied, at times consisting only of the drinks, or of clear mucus, or black vomit: shreds of epithelium were sometimes observable. These might also be seen throughout the whole intestinal tube, as well as black vomit. In one typhoid case (before-mentioned) there was a perforation of the ileum, ulceration having taken place in a patch of Peyer's glands. The kidneys were invariably congested, and this was always well marked in the pyramids: on pressure, the white, creamy matter described by Blair and Lawson, was seen to exude from the papillæ, and consisted of epithelium and casts from the tubuli uriniferi. The bladder was contracted, its mucous membrane being pale. In several instances, all the white textures of the body were tinged of a yellow colour.

The following two letters have been submitted by Surgeon-Major Barrow for the consideration of the local military authority, containing recommendations as to measures which, he is of opinion, should be taken both in anticipation and in the event of another epidemic occurrence of yellow fever in the colony.

Sir, *St. George's, Bermuda, January* 8, 1865.

I have the honour to submit, for the consideration of the Colonel Commanding, several sanitary measures which are of great importance. The diet of the troops at the Station is objectionable and, I believe, conducive to bilious fevers. Salted and very fat pork is issued to the troops twice a-week. This indigestible food is prejudicial to their health during the summer months. It abounds in carbon which, however essential in northern latitudes in the way of supplying fuel for the production of animal heat, become positively injurious in a climate where the temperature ranges between 83° and 90° Fahrenheit, at noon, for five months together. Mutton might, with great benefit, be substituted for two days in the week, and fresh beef issued on the other five, during the summer months. Additional wood is said to be required for baking, beyond what is now supplied. The issue of extra bread and groceries by the Commissariat is an excellent step, but there is still a want of vegetables.

In Bermuda almost every vegetable of either a tropical or a temperate climate arrives at perfection, and can be cultivated with very little trouble. I strongly recommend every encouragement to be given to the formation of soldiers' gardens. Probably the Home Government would grant some pecuniary assistance, when prizes might be given, as in India. In fact, the Indian system would be of great advantage at this station for, as well as the great benefit derived from the vegetables, the men's time would be healthily employed, and there would be fewer visits paid to the low drinking-houses in the filthy town of St. George's.

For many years past I find it recorded by Medical Officers that drinking to excess prevails to an unusual extent in Bermuda. There is scarcely any amusement or rational means of occupation for the troops. Trollope well describes the general listlessness and want of animation on the part of the natives. This seems to extend to the troops who, for want of employment, seek excitement in drink. A large piece of Government land, called the "Park," and in the neighbourhood of the Royal Barracks at St. George's, might be prettily ornamented by the men, flower-beds laid out, paths made, &c. They would take great interest in it, and the Park would not only prove attractive to them, but to the community at large. Several skittle-grounds, an American ball-alley (all covered in), and a good racket-court, should be provided in the close vicinity of the barracks. A soldier's club would be of great value, established on the Montreal system, having comfortable rooms, cheerfully lit up at night, and provided with various amusements, as draughts, chess, bagatelle, and even billiard-tables. Refreshments should be obtainable, as sandwiches, biscuits, tea, coffee, ale, porter, and good wholesome wine, &c., at reasonable charges. A moderate outlay of the public money on these objects would be found to be profitable in the end.

I wish to add a few remarks on the subject of barracks. Whenever any new buildings are erected which are intended for occupation by the troops, it is advisable that they should be always raised from the ground some eight or nine feet, on stone arches or pillars. It is found to be of essential importance in yellow fever countries to keep individuals from the influence of terrestrial emanations. I write with confidence on this subject for, after some years' residence in Kingston, Jamaica, I was able to point out with tolerable certainty the houses in which new comers were in the greatest danger from fever, or the reverse.

Rain-water tanks should never be placed, if possible, nearer than 50 or 60 feet to any residence. The damp exhalation is unwholesome; the atmosphere above the water also becomes stagnant,—always a source of danger during yellow fever epidemics. Shrubberies and walls around buildings are dangerous for the same reason. Wooden or iron railings are far preferable to walls. Deep, open drains or ditches are also to be avoided. Latrines should not be made so near dwellings as they usually are and, if possible, should be to the east or the west of the houses.

I consider wood preferable, for building purposes, to the soft calcareous stone of these islands which, from its porosity and impregnation with salt, has great power in absorbing water from expired air, as well as from the atmosphere.

I have, &c.,

(Signed) T. W. Barrow, *Surgeon-Major*,

To the Fort Adjutant. *Principal Medical Officer.*

P.S.—I find there are about six acres of good rich land available for gardening purposes in the vicinity of the Royal Barracks.

T. W. B.

Sir, *St. George's, Bermuda, January* 10, 1865.

I take the opportunity, before leaving the Command, of submitting to you (now that the late visitation of yellow fever has ceased) a series of recommendations as to certain sanitary and precautionary measures which I consider to be of the utmost importance, and as to the best mode of action in the event of another epidemic outbreak of the disease.

Having had experience of epidemic visitation in all four quarters of the world during a long period of service, including two outbreaks of yellow fever, I have less hesitation in stating my views on the present occasion. I trust you may not consider that I am exceeding my proper sphere of duty in entering somewhat into military subjects, such as questions of defence, &c.; but it is, to a certain extent, unavoidable.

At the commencement of an epidemic outbreak measures should be taken—

1st. To remove the troops from the threatened quarter, and to encamp them at a distance of at least three miles from any town.

2nd. To procure sufficient transport accommodation to convey three-fourths of the troops to Halifax, leaving the defence of the islands to the Royal Navy.

3rd. If fever break out in the vicinity of St. George's, to at once remove the head-quarters, commissariat chest and stores, purveyor's stores, as well as the sick in the General Hospital to a camp at Ferry Point.

4th. To employ black labour, in place of white, for all fatigue duties.

The troops should be removed from any barrack or fort on the first confirmed case of yellow fever appearing, either in such building, or even in the vicinity.

It is of great importance, for several reasons, that a camp should be formed at a distance of at least three miles from any town, particularly as then the men can be the more easily kept from the facilities of drinking to excess.

Many, even of the steady soldiers, became intemperate both in 1853 and during this epidemic, and no doubt the mortality was largely increased by this cause. Of late years there have been only two military stations in the Bermudas, St. George's in the extreme east, and Ireland Island in the west.

At whichever of these Stations fever should first break out, the troops should be immediately withdrawn, and dispatched to Ferry Point. This locality has been satisfactorily proved to be the healthiest of any in the islands for an encampment, both in 1853 and this year. It is tolerably certain that the whole of the men who died there lately contracted the fever in St. George's, having been employed on various fatigue duties. Boaz Island is also advantageous in many respects for the formation of a camp, provided there is no fever in the Naval Dockyard, Ireland Island. There is no town near it, and there are no facilities for procuring drink.

On the appearance of the second verified case of yellow fever, an application should be quickly sent to Halifax for transport vessels to remove the troops. A sporadic case is occasionally met with in the autumn, and would place the authorities on the alert. If one case appeared among or near the troops, it would be sufficient to encamp them, and watch events.

An epidemic generally gives some warning; it is frequently preceded by a few solitary cases, perhaps fatal, for two or three weeks. Slight febrile attacks may become common, diarrhœa may prevail, or zymotic disease in some other form may give a timely warning.

The third recommendation should be carried out with the greatest promptitude. Its neglect during the present epidemic has cost many lives, as it did also in 1853. First, as regards the officers: 30 officers contracted fever at St. George's, as far as it can be determined; and of this number 14 died. Ten of the officers who died had been living in quarters. Had these 30 officers been removed to one of the camps, in all probability not even two would have died. For at Ferry Point, where the head-quarters of the 2nd Queen's were encamped, only one officer died, and he had been frequently in St. George's, where no doubt the disease was contracted. There is a natural disinclination to move out of comfortable quarters but the necessity to do so is manifest.

Then as regards the men: after the 2nd Queen's had been removed from the vicinity of St. George's to Ferry Point men were continually being required for various fatigue duties, and were sent back to St. George's to dig graves, do duty as orderlies in the General Hospital, bring supplies out of the town, act as boatmen, carry messages from the signal stations, &c. Numbers of these soldiers were seized with the disease and died. Yellow fever of so malignant a character was prevailing at the time that scarcely any Europeans living within a mile of the town escaped an attack, and of those seized nearly 33 per cent. died. On my arrival at St. George's the epidemic was almost at its height; it was too late to carry out the third recommendation. Very little carriage or labour was available to remove stores in any quantity from the town. No provision had been made for the commissariat chest, the sick were "pouring" into hospital, the cases being mostly of too severe a nature to admit of removal. In a few days, also, six Medical Officers (including myself) were prostrated with fever, one officer only remaining fit for duty. Under these circumstances I had the sick in hospital dispersed in marquees, and again urged the necessity of preventing the influx of fresh blood into the pestilential atmosphere of St. George's, and requested the procurement of black labour for all fatigue duties.

With great difficulty "black labour" was obtained, and in sufficient quantity to do away with the necessity of bringing in soldiers from the camp, consequently the admissions into hospital soon ceased. The effect of these measures was indeed most excellent.

A few days after my arrival I urged the necessity of quickly removing the healthy troops to Halifax, more especially the 2nd Battalion 2nd Regiment, which was quite unacclimatized. More than 400 men were accordingly sent to Halifax, and without doubt this measure saved very many lives.

There had been an opportunity at the very commencement of the epidemic of sending this regiment to Nova Scotia, as the transport which brought the corps from Gibraltar was then lying off Ireland Island; the opportunity was unfortunately not seized.

Had two companies of a West India Regiment been in Bermuda, their services would have been invaluable; they could have performed all the fatigue duties which caused the death of so many of the white troops. It must be remembered that Africans are but little susceptible of yellow fever; I therefore strongly recommend that two companies of black troops be introduced to form a portion of the regular garrison. I also venture to propose that (for several reasons) a reduction be made in the number of the white troops.

Yellow fever is always attracted by bodies of overcrowded men. I find there is not nearly sufficient barrack accommodation for the usual force, an average of 1,150 men. Even allowing so little as 500 cubic feet of space per man, there is only barrack accommodation for 909 men; but in this climate, which is quite tropical in the summer months, each man should have at least 750 cubic feet. At this rate there is accommodation for only 606 men. It is possible that the present force can be reduced, since the convict establishment has been abolished. If so, a wing of a Line regiment might be considered to be a sufficient garrison, with two companies of black troops, and the present force of Artillery and Engineers. Not much additional barrack accommodation would then be necessary, and there would be less "food" for yellow fever when it next revisits these islands. I am of opinion that it would be advisable to reduce the period of service at this Station from five to three years. There is scarcely any rational amusement for the troops, so necessary in this semi-tropical climate; the men consequently become despondent, and at last take to drink in despair.

It might be possible to carry out a system of reliefs between Halifax and Bermuda, so as to render this equivalent to a three years' station.

There was one cause of mortality which was preventible. Seven sentries are usually required to protect the Dockyard, Spar Yard, and Naval Hospital at Ireland Island. It was, therefore, necessary to form a camp in the vicinity. As the fever increased in severity, repeated applications were made to have the sentries discontinued. They were only gradually reduced, one or two at a time, until the 1st October when they were finally abolished. This should have been done at the commencement of the epidemic; many lives would have then been spared. I was informed that the naval storekeeper had specific orders from the Admiral commanding at Halifax, which he felt compelled to carry out. As a similar loss of life took place during the epidemic of 1853, I strongly urge the necessity of steps being taken to prevent any such occurrence in the event of a third epidemic.

The Board of Admiralty will, no doubt, devise a remedy on being made acquainted with the melancholy facts. In anticipation of another visitation, at some future time, I recommend that certain arrangements be made, so as to admit of the instant removal of the commissariat chest and stores, purveyor's stores, and the sick from the General Hospital to Ferry Point. To carry this out it will be necessary to erect a few buildings. A hospital for about 40 patients will be required; it might be constructed of wood but should be raised eight feet from the ground on stone pillars, or on open arches. A commissariat office and store, a bakery, and a purveyor's office and store, would also be necessary. They might be constructed of wood at a small expense, and they should be placed at some distance from the camp ground; the buildings also should not be crowded together. A good site can be found on the rocky ground to the north of the peninsula overlooking the camp ground. No walls, trees, or shrubberies should be allowed near these buildings, nor anything which might cause an impediment to a free circulation of air. The camp ground itself should be kept clear of all buildings.

The wretched sanitary state of the town of St. George's most materially affects the health of the troops in its vicinity and, on account of the number of fortified posts, a considerable number of men must necessarily be quartered in the district. It can scarcely be expected that the troops will escape disease under the present circumstances and, when an epidemic of fever does break out in the town, we have had sad proofs how the military suffer from the shortcomings of their neighbours. Owing to the large number of privies (and which are rarely emptied) the soft, porous sandstone must be thoroughly impregnated with the liquid sewerage. The town will certainly suffer from severe visitations unless a proper system of sewerage is carried out. This is a matter of first and vital importance, and calls for immediate action. The first expense of constructing sewers will be heavy but, probably, a loan could be raised for the purpose, the payment of which might be extended over a number of years. Many other sanitary changes are required, particularly with regard to the overcrowded state of the houses, widening of streets, &c. Hamilton is equally destitute of sewers.

The Royal Barracks are excessively close and sultry in the summer months; their sanitary state would be much improved if the walls were raised four feet, and the windows heightened in proportion; at the same time the under-floor ventilation should be increased. The officers' quarters adjoining are wretched indeed, and should be re-built; the rooms are very small, the ceilings low, and the kitchens beneath are quite uninhabitable. The quarters could be somewhat improved, if the ceilings were raised 18 inches, and a space left at the top of the wall which separates the front from the rear rooms, for the sake of ventilation. Each officer should then have two of these very small rooms.

Some valuable lives would have been saved had the electric telegraph been in use. Men were constantly carrying messages from the signal stations to districts where the epidemic was most intense; several were thus seized with fever and died.

Particular care is required as to the time of sending out drafts or regiments from England. I consider the end of October to be the most suitable period, as then it would be known at home whether the islands were free from fever, July, August, and September being the dangerous months in Bermuda. It would also allow time for the troops to become acclimatized to some extent, and to be better prepared to resist a future visitation, should it unfortunately occur.

I also beg to suggest that definite instructions be printed and circulated among all the departments. The code should be so drawn out as to take responsibility from individuals as much as possible, and the mode of action both in anticipation and in the event of an epidemic outbreak should be clearly defined, both for the military and civil departments.

I firmly believe that no very considerable loss of life will be incurred in future if all these measures are carried out. The necessity for action need not be dwelt upon, when I state that no less than 14 officers, 173 men, 5 women, and 4 children fell victims to the late epidemic of yellow fever.

I have, &c.,
(Signed) T. W. Barrow, *Surgeon-Major*.

THE JAMAICA COMMAND.

Mr. Bent, Deputy Inspector-General, has reported that no sickness occurred this year which could be ascribed to either defective construction or local peculiarities of barracks, nor on careful inspection of the different stations could he detect any exciting cause of disease that admitted of removal. Tropical heat and tropical habits, he aptly expresses it, had their full share and, as usual, a large one, in contributing to the hospital returns, though naturally less at the Mountain Station than on the low lands, and an illustration is given in the case of the European regiment, the chief sickness in which occurred directly from the temporary quartering of some companies of the corps at Up Park Camp, on the plains, during the months of July, August, and September; so soon as they were withdrawn and returned to the invigorating atmosphere of the Mountain Cantonment they again resumed their steadier habits and soon attained their former high standard of health.

Sundry much-required sanitary improvements were effected in the course of this year.

At Newcastle.—An increased supply of water was secured by the provision of 25 tanks, fitted in the barracks. An additional ablution-room, with two fixed baths, was constructed, and ovens, long required, were supplied to the soldiers' cookhouses.

At Up Park Camp.—A kitchen for the sergeants' mess, increased lavatory accommodation for the men in barracks and sick in hospital, and glazed windows to the guard and lock-up rooms were provided.

At Kingston and Spanish Town.—Roof ventilation was applied to the men's barrack-rooms.

At Honduras.—The troops were encouraged to utilise much of their spare time and trained to gardening, with the successful result of benefit to their health and provision for themselves of fresh vegetables, of which there is represented to be a great scarcity in the colony.

THE WINDWARD AND LEEWARD ISLANDS COMMAND.

Deputy Inspector-General Dr. McGregor reports that 1863 is to be considered as having been a favourable year in sanitary respect at Barbadoes, it was peculiarly a dry one, 27 inches of rain only having fallen, in contrast with 56 in the preceding year—one of epidemic visitation by yellow fever.

He states that during the year many questions connected with sanitary services came under consideration. Amongst these was that of a new site for barracks for the European corps, to be on some elevated locality of the island.

In the course of the year many arrangements were effected which materially improved the hygienic condition of the garrison of St. Ann's. An increased water supply from the Bridgetown Company's works was provided for the troops, and the wastage directed towards cleansing the barrack drains, which, formerly, were great sources of impurity. In October of this year the foundations of married barracks, for 20 families of the European regiment, were laid on a clean, airy site. Improvements were made in the drainage of the Savannah which occupies the central space of the garrison and, from its cup-shaped coral formation, used to retain rain in its hollows.

The conservancy system of the garrison was ameliorated by improving the state of latrines and, at the "Stone and Artillery" barracks, by introducing a better arrangement of urinals and system of the drainages.

Various questions, also, connected with the re-distribution of the military quarters and barracks were considered, and the principle of abandoning ground floors for sleeping rooms was to some extent adopted.

At Trinidad the health of the troops was good. The drainage of the St. James's barracks and precincts was much improved during the year by means of underground pipes, effecting a complete system of sewerage, extended to the seaboard about a mile from the garrison. The troops have now the benefit, in addition to the ordinary means of ablution, of a commodious plunge and swimming bath, and their cooking facilities are good.

At Demerara the health results to the troops bespoke a highly sanitary condition of the site and barracks of Eve Leary and a strict hygienic surveillance by the military and medical authorities during the year.

WEST COAST OF AFRICA.

SANITARY REPORT OF THE GOLD COAST, INCLUDING LIKEWISE A SHORT ACCOUNT OF THE EXPEDITION AGAINST THE ASHANTEES.

By Staff Assistant-Surgeon W. A. GARDINER.

UNTIL 1862 the stations along the Gold Coast were garrisoned by a local corps of Artillery of very limited strength. This force was in that year reinforced by a detachment of two companies of the 2nd West India Regiment, brought up from the Gambia in consequence of hostilities breaking out between those tribes under British protection and their neighbours the Ashantees.

The united force under Major Cochrane having failed to chastise the Ashantees sufficiently, it was determined to send a full West India Regiment to effect that purpose, and consequently in August of the following year (1863), the right wing of the 4th West India Regiment (which had only just been raised) arrived off Cape Coast Castle in H.M.S. "Megæra." In the meantime the Gold Coast Artillery Corps was broken up for having mutinied.

Before proceeding with the account of this expedition, I will give a short description of the country, climate, resources, &c.

The Gold Coast is that portion of the western seaboard of Africa extending from the River Assim to the Volta, Assim being its western and the Volta its eastern extremity. Its geographical position is 5° 40′ N., 3° 0′ W., or rather the line of coast lies between that and 0° 40′ E. From Cape Palmas the coast trends east, with a northerly direction after passing Cape Coast until it reaches the Gulf of Guinea, when it turns almost due south to the Cape of Good Hope. From Cape Three Points to Accra the coast has the same monotonous appearance; a long, glistening, sandy beach, where the surf is for ever breaking; beyond this, stunted, but green vegetation is seen, and low hills, varying from 200 to 600 feet high, form the boundary to one's vision. If near enough, the brown mud walls and thatch roof of the villages along the coast can be seen, and of course at intervals the towns of importance are distinguished by the appearance of forts, Dutch or English, most of them in a ruined state.

No signs of cultivation are visible from seaward, and each town and village appears surrounded by dense brush growth. This is really the case, except in the instances of Accra and Winnabah, where the country is more open and flatter. The hills are mostly conical in shape, and have an uninteresting, stumpy appearance; the highest are down towards Accra, one close to the shore near Winnabah is 670 feet high, called Mamquaddy Hill; a still higher one belonging to the Mamquaddy Range, is 930 feet high.

Dix Cove is the first place (going eastward) that is met with where British troops are kept. Between that and Cape Coast Castle are several Dutch forts, and English and Dutch villages, the forts mostly in ruins, and the villages peopled by very wretched fishermen. The Dutch fort of Elmina is their principal place; eleven miles further on is Cape Coast Castle; next is Annamaboe, nine miles from the last; then comes Winnabah, about thirty-six miles from Annamaboe and the same from Accra, which is the most easterly point on this coast held by troops.

At Cape Coast is the seat of Government; at each of the other places there are civil commandants appointed by the Governor; and generally a small number of soldiers, the officer in command holding the commandantship. At Accra there are several officers and one company of the 4th West India Regiment; at Dix Cove, Annamaboe, and Winnabah, ten men and two officers at each (one an Assistant-Surgeon).

The Gold Coast is deficient in rivers and harbours; at all the stations except Elmina the landing is effected in an open roadstead. The Dutch possess those places where the landing is best.

On account of the heavy surf, caused by the wind and tide setting directly on the shore, embarking or disembarkation can only be effected in surf canoes specially built for the purpose, and paddled by natives, and then only with difficulty and often danger.

At Dix Cove there are ten men of the 4th West India Regiment ; a subaltern in command, who is also a justice of the peace, and acts as civil commandant. An Assistant-Surgeon is stationed there also. There is nothing in the village ; little or no trade occurs there ; the town is close to a lagoon, and shut in from the interior by low hills and bush ; the communication is kept up with Cape Coast by a canoe, which goes to each out-station once a month, and by postmen who travel overland. This land journey is extremely difficult ; it passes along the beach and over rocks, and, like the overland road to Accra, is without shade the whole way, and most harrassing to any one but a native to travel. Some gold dust and palm oil form the trade of Dix Cove.

Cape Coast Castle is situated 5° 6′ N. lat., and 1°13′ W. long. It is the principal possession of the British on the coast, and consists of a large irregular building, in appearance very strong, but it has been so added to and built upon that however strong the original fort was it can hardly be considered firm by any one who has felt it shake in a heavy storm. Even the beating of the surf on the rocks which form its foundation causes the walls of the castle to shake plainly.

The castle is a large irregular building, consisting of two triangular enclosures ; the larger of the two has its base facing the sea ; the base of the smaller triangular space is formed by the western side of the larger triangle, and is consequently placed with its apex (called the Spur Battery) to windward, and which is very well adapted for keeping out all air. This Spur Battery has always been considered unfit for quarters, and very rightly so, as ventilation is almost entirely absent in the quarters which it contains.

The lower tier of rooms are used by the men as quarters, the uppermost by the officers. The glare of the sun on its whitewashed walls, and the heat reflected by walls and flags of the yards below, and the constant noise of the surf often breaking over the sea battery, and of the soldiers who live so close to the officers' quarters that any quiet and stillness are out of the question, render the castle by no means a pleasant residence, and for a sick man it is almost intolerable. There are large tanks in the castle, built underground in the courtyards, and one large tank is under the sea battery ; but owing to leakage in the roofs, pipes, and tanks themselves, little water was caught during last rainy season ; at no time were the tanks full, which, if the roofs and pipes were sound, would not have been the case.

There is nothing very remarkable about Cape Coast Castle, except perhaps, the grave of L.E.L., wife of Governor Maclean, and well known as a poetess. Her grave is in the front courtyard, *hardly* marked by a rude cross in the flags ; beside it lies her husband's grave, and many other officers and merchants have been buried about the yard also. This castle was originally a slave depôt. The sea breeze, which is generally felt blowing strongly at Cape Coast, predisposes the stranger in favour of it. The town consists of some good solid merchants' houses, and a number of very wretched-looking native mud houses, which, with their half broken-down walls, brown thatched roofs, and crowded irregular manner of building, give the town an appearance of squalor and misery.

The town is shut in by low hills, which extend in a line almost parallel with the coast from Fort Victoria (half-a-mile to the westward below the town) to Fort Macarthy, a little above the town. This range of hills lies behind the town, is nearly three-quarters of a mile long, and nearly continuous. The centre hill is the highest, about 350 feet high, and has on its summit Fort William, in which is the lighthouse. To windward of the town is a large lagoon, running inland for more than half-a-mile ; in it the tide rises and falls, and the malarious emanations from which were found to be so baleful that Fort Victoria, which lies right over and to leeward of this lagoon, had to be abandoned. The neighbouring hills are covered with low scrub and underwood. There are no signs of cultivation near Cape Coast, as the natives who cultivate corn or yams go long distances inland to farm, but as a rule the coast towns are composed of fishermen, and they confine themselves to this occupation; their wives carry the fish inland to the bush towns, to exchange for corn, yams, &c. At Cape Coast the natives (as elsewhere along the coast) bury their dead beneath the floors of their houses; they never make or use waterclosets or latrines of any kind; their habit is to go down to the beach, or anywhere, no matter how close to their own houses, and when they are not prevented doing this the stench of the towns is positively intolerable. The native name of the town is Iquah; it has a good Protestant church and Wesleyan mission house and chapel.

The trade of Cape Coast is gold dust—no palm oil is exported; it is the depôt for other towns along the coast and inland towns for imported goods. Gold dust is washed out of the dust swept off the street. The geological formation is granite, mostly in a decomposed state; the hills are composed of red clay and broken-down granite and sand. There are no good wells and no river or stream at Cape Coast.

The next town where English soldiers are stationed is Annamaboe; it is a small town, with very few good houses in it; the fort is small and wretchedly shaky. Here are ten men, with two officers, one a Staff Medical Officer. The distance from Cape Coast is about twelve miles by land and nine by sea. The landing at this place is very bad; it is not so much shut in by hills as Cape Coast, but the general aspect of the country is much the same. Palm oil and gold dust are exported here.

The next place with a detachment is Winnabah; however, the station is only a civil one, there are no military quarters here. Since the termination of the expedition against the Ashantees, ten men, with two officers, one a Staff Medical Officer have been kept here. The men are accommodated in the civil commandant's house (the officer in command). At Winnabah the country is open and remarkably fine; there is a good deal of cultivation about here. A large cotton plantation was commenced, and a considerable plant in the way of machinery brought from England to work it; but, from the gross ignorance and incompetence of the speculator, it failed, and a few days ago the whole plant sold for less than its carriage out cost. The country about Winnabah is open and park-like; extensive grassy savannahs stretch inland, with hand some clumps of trees; but a great drawback is the want of water. There are two rivers, each within a mile and a-half, but the roads are bad, and the water from one of the rivers is brought in small quantities on the heads of natives, and from the other in canoes over a rough bar. At present the water is costing more than 3*l.* per month for ten men.

Accra, or Akra, is the most easterly station of the troops on this coast; a full company, two Regimental officers, and generally two Staff Medical Officers are stationed here. The castle has been destroyed by earthquakes, which are very common here,—so much so that no one would wisely build any other than wooden houses. The troops are billeted in hired houses. The climate of Accra is considered healthier than that of Cape Coast; the country is open and grassy, like that at Winnabah; cattle will live here, and even horses of a poor, small breed make a show of resisting the climate; however, there are seldom more than two horses in the whole place, and they are more of a curiosity than a means of transport. Cotton is cultivated by some missionaries (German) in the hills inland from Accra, and some of the best coffee, fruits, and vegetables are also produced here by those most practical of foreign missionaries.

Inhabitants.—It is an unpleasant but no less a truth, that the natives along this coast—even round the English forts, and close to the influence of the Colonial Government—are still almost universally savages, as pure and unadulterated with European civilization as one would suppose they were two hundred years ago. The only civilizing influence on the coast is that of the missionaries, and that is slow and uncertain, not because the people withstand them, or are too much wedded to their own religion (Fetish), but simply that their minds cannot comprehend how a religion of universal love could possibly become general. They only know religion to be a mask for cruelty, oppression, and wrong, and cannot readily believe that one so different as the Christian faith could be meant for them. And yet they are aware of the deceit practised by their Fetish men; many of their native names signify that they are robbers; that their Fetish practices are only a cloak for greediness; but they are so imbued with the abstract feeling of superstition—that horror of darkness which a child shows—a feeling, perhaps, undefinable in itself, except as a direct reference to the devil of every phenomenon which they cannot explain—that they go on trusting to the priests the management of their spiritual concerns. In all the towns they have their Fetish houses, called differently along the coast joss houses, ju-ju houses, &c.; they have no regular belief; what the Fetish is, hardly any one knows, except that it means something dark, mysterious, or secret; they can make anything Fetish by breaking an egg over it, and spilling some rum or palm wine on it. The Fetish religion, if it can be called so, is only to be described as a superstition, the result of the lowest and most brutal state of the human intelligence.

The people individually are docile and quiet; they have a great reverence (fear ?) for the white man whom they invariably call master; they are capable of great and prolonged labour, and yet are extremely lazy and idle; for a small recompense they will go long journeys, carry great weights, &c.; but to improve their own houses, or cultivate more ground, they have insurmountable objections. Along the coast the men fish, and their wives (wife and slave are synonymous terms on the Gold Coast) cultivate small patches of ground, or sell the fish for corn, yams, &c., cut and fetch firewood, and in fact do all the hard work, while the husband lies basking in the sun on the beach. The fish so easily caught appears to be a curse to the country, for while a native can run out in his own canoe and catch fish enough to last a few days, he will never do anything else, or try for a better diet. They dry the fish in the sun, and so cure it. The corn is ground by rubbing between two rough stones, then soaked and boiled, and made up into lumps rolled in plantain leaf; in this state it is called "canky," and eaten cold; in the process a slight degree of fermentation has taken place, giving it a sensibly acid taste, which the natives particularly like. This canky is the bread of the coast, or more than bread, as vast numbers of them never have anything else; as a food it appears to be highly nutritious, and custom makes them prefer it to anything else. Dried fish, palm oil soup, monkey, snails, and yams, and plantain, with a few vegetables, compose the food of the natives. Cattle are very rarely seen except as Fetish cattle, and these are not to be killed. Sheep are wretchedly poor, and are kept for Fetish purposes mostly; fowls are plenty in some places, but are never fed up for killing—the natives hardly ever eat them. So the amount of animal food consumed by the poorer people is very small; condiments such as pepper they use in large quantities in everything.

Resources.—The resources of the Gold Coast are few indeed; roads can hardly be said to exist, as they really are no more than tracks; and partly depending upon this, and partly due to the fact that horses will not live on the coast, the means of transport are of the worst and most tedious description. To pass from one station to another, either a canoe or a hammock must be used; if the former, one must be exposed, in a small most inconvenient open boat, either to the fierce heat of the sun all day, or the chills and danger of a passage by night. If a hammock is the means employed, the journey is more tedious, the exposure to the heat by day as great, and stoppages at villages without any accommodation required; to some the jolting and cramping effect of being carried with one's feet higher than one's head are intolerable. Thus good transport there is none, and so one of the main and most requisite means of opening up a country is lost.

Food is perhaps the next necessary as far as troops are concerned, and it is about as scarce and bad as it could possibly be. As far as Cape Coast is concerned, there are no means there for supporting troops whatever. At Accra cattle of a small breed are obtainable; but at none of the other stations can fresh meat be had in sufficient quantity to feed troops. Sheep are brought up from Accra to supply the officers' mess at Cape Coast Castle, and fowls for the same purpose; but at the smaller stations, as Dix Cove, Annamaboe, and Winnabah, fresh meat is unattainable. Even at Accra fresh meat is by no means always to be had. Then fresh vegetables are neither sufficient in quantity or variety. Yam, in itself an excellent substitute for the potatoe, is the vegetable mostly used; but then for a body of men there ought to be a variety. Plantains are not very much cultivated near the coast. A vast variety of fruits and vegetables could be grown here, but they are not, and it is forgotten by those who talk so much about the capabilities of the coast, that if these things can be easily raised here, then, with a very good demand for them, no one has considered it worth his while to cultivate them for the market, and consequently the result is the same. But the character of the native is very far removed from enterprising, and one thing they don't understand is the wisdom of spending money in the hope of increasing it; they almost invariably bury their talent lest it might be lost.

Water supply is bad at every station held by the British on the coast. At Cape Coast the supply is from rain caught on the roofs and conveyed into tanks underground: but with the greatly increased garrison it was found quite insufficient, and besides more than half was lost last rainy season by leaky roofs, pipes, and tanks. It is a great objection to the coast as a military station that at none of the towns can a good and constant supply of fresh water be depended upon. Wells are useless here for drinking water, as they are invariably brackish and bad; there is no exception to this at any of the stations—in all water is procured with difficulty and expense. At the present moment water at Winnabah, as before stated, is costing more than 3*l*. per month for the men.

As the three principal requirements for troops, viz. food, water, and means of transport, are wanting on the Gold Coast, it will hardly be necessary to enter on the other defects existing here, such as inferior barrack accommodation, absence of means of amusement for the troops, its great distance from any place which could be used as a sanatarium, and also the length of time between the arrival and departure of the mails, the only means of removal from the coast.

Climate.—The climate of the Gold Coast is notorious for its unhealthiness, and that Europeans cannot live here more than a year in good health is pretty true of the whole extent of the coast: the few exceptions to this rule do not affect the truth of the statement, for the proportion of those unable to live a whole year here is greater than those able to last out two years or more.

Very little can be said in favour of any one place on the Gold Coast more than the rest as to a preference. Accra is said to be healthier than Cape Coast, but the difference is not very well marked. The coast is unhealthy, both on shore, and close along the sea; and along the coast in trading vessels as far out as a mile, or even two, the mortality and sickness among the merchant shipping is as marked as among the European residents on shore. The diseases peculiar to the coast are periodic or malarial fevers, diarrhœa, and dysentery. There has been such conflicting evidence offered concerning the origin and cause of the fevers here, that it appears to be erroneous any longer to characterize remittent or intermittent fevers as necessarily arising from marshes or swamps, as it is now placed beyond all doubt that these fevers are constantly to be met with where there are neither swamps, marshes, nor even rivers near at hand.

At Cape Coast the land is dry and hard in the summer season; it is excessively porous; water, after the heaviest rains, is rarely seen to lie—it is at once absorbed, and I think there is something very significant in that fact. This is the state of things said by Dr. Watson to be necessary for the production of malaria: "A surface capable of absorbing moisture, and that this surface should be flooded and soaked with water and then dried; and the higher the temperature and the quicker the drying process, the more plentiful and the more virulent is the poison that is evolved."* These conditions exist in perfection not along the coast only, but how far inland it would be indeed hard to say.

The peculiar severity of these diseases on the coast have caused many speculations to be made respecting the origin and source of the poison. It has been frequently remarked that in the same latitude in South America, with everything that has been so constantly pointed out as causes of the diseases here, the same disease is far from common, and by no means marked by such severity as on the coast.

The remarkable prevalence of this marsh fever on the Gold Coast has been variously attributed to the disengagement of sulphuretted hydrogen and its action on salt water, to submarine volcanic action, and to decaying vegetable matter, to certain chemical changes going on in the soil of localities wherever vegetation is rank and abundant, and to a surface capable of absorbing moisture, which shall be flooded and soaked and then rapidly dried.

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* Dr. Watson's Principles and Practice of Physic.

Dr. Madden is of opinion "that these perils are occasioned by atmospherical conditions and circumstances connected with vegetation, and not by peculiarities in the waters of these countries. Whenever there is hot and humid atmosphere and an uncultivated country, with rich soil and rank rapid vegetation, the elements of African disease are to be found, and there also its perils to be avoided."

This is no doubt true as far as it goes, but it gives no solution of the difficulty. In Brazil there is a hot and humid atmosphere, and rank rapid vegetation; but it is stated the same disease is not to be met with. There is something more yet to be discovered before the frequency and virulence of fever on the coast can be explained.

It is not my purpose to enter into this question now, unless so far as it can account for the sickness of the troops during the expedition; but I would remind any one who is astonished at the prevalence of fever on this coast, of the conditions under which it exists. Here is a coast line from Cape Palmas to Lagos of more than twelve degrees of longitude (or over 720 geographical miles) on which the south-east trade blows by day, and off which the land breeze blows by night. Can any one suppose that it is the sea breeze merely returning that is felt? Well, the interior for thousands and thousands of square miles is covered by dense forests, with innumerable marshes and swamps, without lofty hills to stop the spread of exhalations; over this immense country the sun exerts his full power in drawing up the steamy vapour so much spoken of by Dr. Hutchinson;* this mounts by day, and by the time the night breeze sets in it is ready to be wafted on its wings to the coast.

And this operation goes on for ever here, and the only time the coast is considered healthy is during the part of the year when the action just described is weakest, namely in December, January, and February, by which time the inland country has become dry, and the sun has lost a considerable amount of his power to draw up the exhalations alluded to.

This dryness of the interior is fully proved by the fact that all the rivers by this time have greatly fallen; and again the Harmattan wind, which is so remarkably dry, reaches us in that state, so that it cannot pass over a wet country is pretty certain.

Then the great danger of exposure by night, particularly in such places as Cape Coast, where the ground is dry and no swamps near, all point to the influence of the night breeze.

I do not pretend to explain what others find so difficult; but I do think that the vast amount of material for disease brought down by the land breeze is quite sufficient to account for African fevers, their virulence and prevalence, without composing theories of chemical action in the air, chemical action in the earth, and submarine volcanic action, &c., &c., as the source of the poison.

Before dismissing this subject I would point out what is more material to the practical question of why our troops suffer here so much. On the Gold Coast officers and non-commissioned officers (European) are deprived of all those amenities of life which in every other place in the world (no matter how unhealthy) exist in some proportion—I mean society—the society of their countrywomen, amusements, as riding, driving, races, shooting, &c. On the coast no English ladies are to be met with; no white women as a rule can get on here; then in the absence of horses, there are no means of moving about except in a hammock, which to most men is excessively disagreeable. There is nothing to draw the English officer out of his room; add to all this, the inferior food, and it is not astonishing that British officers do not thrive here. When they land on the coast, the first idea is, when they shall be released from what they consider, and what really is, a banishment. They know they are here not in the ordinary course of the service, but by necessity, and the abiding thought is "How long have I now to remain?"

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* Dr. Hutchinson's Western Africa.

The dysentery which is sometimes so common I believe is due to a great extent to inferior water and food; that it is aggravated by these there is no doubt, and I am inclined to attribute the unusual severity of this disease here entirely to the food and water. Dysentery is common in all tropical countries at certain seasons of the year; but in all countries but this there is ordinarily good food. Here there is no food fit for patients suffering from diarrhœa or dysentery. I have known Cape Coast to be six weeks without fresh beef, without port wine (except what was in the medical comforts store), or arrow root. No change for a different situation is possible here, and if a man goes on board one of the mail steamers sick with dysentery, the chances are fearfully against his recovery. He has three weeks along the coast before him, with wretched accommodation; in all probability a stifling berth shared by two or three others. He has two days and a-half to lie in the harbour at Sierra Leone while the vessel coals, and twenty-four hours at the Gambia, both places fearfully hot and unfit for him. All this he has before he gets off the coast he dreads so much; is it any wonder, then, that so many should sink on the passage home, or soon after their arrival?

Dracunculus is also very common here, but I don't think there is anything peculiar about it; the symptoms and treatment are the same as elsewhere. The natives believe that they get it by drinking bad water. I have known it occur in the breast of a woman here. This parasite is exceedingly common; nine out of every twelve men or women are marked by it; the ulcers by which it was educted often leave large ugly scars. I have never heard of this disease proving fatal.

Constipation of the bowels is met with here, and often precedes dysentery; it is commonly met with among the natives, and with them the cause is eating large quantities of the food called "kanky,"—merely boiled corn. This clogs their lower bowels, and nearly all of them daily use an injection for its removal. The injection is effected by the person tilting up the calabash, and allowing it to pass down (not up in their cases) by its own gravity. Dozens of them may be daily seen on the beach performing this operation; each person performs for himself or herself.

EFFECTS OF CLIMATE UPON THE EXPEDITION.

Before proceeding to state how the climate affected the Expedition, it will be better to finish the account of the movements of the troops.

I have already stated that in August 1863 the right wing of the 4th West India Regiment landed at Cape Coast, and that there were already on the Gold Coast two companies of the 2nd West India Regiment. Preparations, such as cutting paths through the bush, collecting stores, &c., &c., consumed the time until December; in the meantime the men had suffered very considerably from dysentery and fevers of the intermittent and remittent classes.

On the 14th December I became senior Medical Officer, in consequence of Staff Surgeon Schroeder's illness obliging him to leave the Coast. Early in December three officers were sent on to a native town called Mansue, about half way on the road to the Ashantee frontier, to form a depôt for military stores of all kinds. On the 27th December, one company 4th West India Regiment, marched to Mansue to guard the stores, as they were now fast accumulating. During January the Commissariat and Military Store Departments were all pushing forward the necessary stores; the Medical Department was not behindhand, medical comforts, medicines, hospital equipment, instruments, &c., were all sent to the depôt for transmission to the front or wherever needed. The transport of all these various stores was difficult and tedious in the extreme, as all had to be made up in parcels of 60 lbs. weight to enable one man to carry each, as they do invariably, on their heads; in some cases they carried larger and heavier weights slung on a pole resting on their heads, one in front and one behind, or four men might be sometimes employed, by placing transverse pieces of board before and behind, but the road did not always allow of two walking abreast, and rarely would it permit two to walk abreast with comfort.

Before the middle of January 1864 three of the five officers sent to the depôt returned sick with bush fever, and one remained behind although very sick, making four attacked in less than a month out of five, the fifth was a native black Assistant-Surgeon.

The medical staff now consisted of eight medical officers in all.

The detachment of one company 4th West India Regiment, at Accra, being ordered on to Swadroo, the medical officer in charge accompanied it, and I sent another Assistant-Surgeon from Cape Coast to Swadroo to meet it, in order that there should be two medical officers at each out-station; and this rule was followed during the expedition as long as the strength of the medical staff permitted it.

On the 27th January, 1864, two companies (one company 2nd West India Regiment, and one 4th West India Regiment) left the Castle for the front, followed in two days (29th) by the remaining two companies, with every available man, except the band, some weakly and sick men, and those in hospital; two officers, sick, remained behind, but soon joined; one medical officer was left in charge of the sick in hospital and the women and children.

As the detachment passed on through Mansue (the depôt), they took with them stores of all kinds to last until more were sent up. I left the Castle on the 29th January with head-quarters, and as we passed Mansue we brought on the company which I have before stated went there on the 27th December, 1863; this company had already its toll of sick, which were left behind in some temporary hospitals built for the purpose, in charge of Staff Assistant-Surgeon Horton. We reached Prahsu, a village situated on the right bank of the River Prah.

The positions of these camps relatively to Cape Coast and Commassie, the capital of Ashantee, are as follows:

The bush track to Mansue runs northward. Mansue, from the Castle, is about 40 miles. The track here divides—one to Swadroo, the other to Prahsu. From Mansue to Swadroo is something over 46 miles; to Prahsu about the same. From Prahsu to Swadroo, in a direct line, is about 49 miles, but the bush path is so bad that it is not used. Prahsu, Swadroo, and Mansue, represent the angles of a triangle whose base lies along the border of the Protectorate.

Messengers or officers proceeding from Swadroo to Prahsu had to go round by Mansue, that is round two sides of the triangle.

Commassie is almost due north of Cape Coast, and is said to be 170 miles distant.

The River Prah, which forms the boundary between the Fantee and Ashantee territories, rises among some low hills to the north-east of Cape Coast, and about 150 miles distant; it then runs west and southerly, and then turns south to empty itself into the Atlantic at the Dutch town of Chama, about eight miles west of Elmina.

I thought, at first, this river might be used for sending down to the coast sick and wounded; but, on enquiry, I found it would be impracticable, on account of numerous rocks which obstruct the even course of the river, and would render canoes dangerous.

On the march, an average of 14 miles per day was made, sometimes more, as the halts at night were dependent upon the presence of a village sufficiently large to accommodate the men.

The march was divided into morning and evening marches, to escape the midday sun.

About 10 miles from the coast we entered thick forest growth (previous to that it was all through low bush and scrub with few large trees), which never changed all the way up to the Prah, except the little attempt at clearings just round the natives' crooms or villages, in fact the farther we went the loftier the trees and the denser and darker the forest became.

When we reached a village, when the sun glared in all his power, it was like leaving a dark room for dazzling sunlight, the heat and glare while crossing these openings were most oppressive.

There were no lofty hills to cross; half way to the Prah the path gradually ascended, until I should think at Mansue a height of at least 600 feet was gained.

Large rivers there were almost none, the only two large enough to be designated rivers were one near Mansue and the Prah river; but streamlets were numerous, or rather the now dried up beds of streamlets; in most places the path appeared to be either formed by the stream in winter time, or else used by it when once found.

Although on the march up, these streams were mostly dried, or else very small, on the return march, after the commencement of the rains they were swollen so as to be formidable, and the forest far and near was swampy, and in many places under water for miles.

Hammocks and bearers were supplied at the rate of fifteen per company; these followed to pick up stragglers, if unable to walk.

Before starting in the evening the men had a ration of grog served out, to which I added a dose of quinine when the men had been in the bush three days; this was continued for a week, and then left off for eight or ten days, then resumed.

Prahsu (on the Prah, in Fantee) is a native village built on the bank of the river, it had about fifteen native-built huts when we arrived: a description of this will serve for all the other native bush towns.

The houses or huts are built of palm-leaf stems, split, and placed like the bars of a cage, these are kept firm by cross pieces. The roof consists of palm leaves without the stems, laid on thatch-wise; the floors in the best built native huts were raised about 18 inches off the ground, and were made of red clay, baked hard.

The natives build their huts in quadrangles; each hut has one door, no windows, and the door opens into the square formed by the four huts; in this hollow square all cooking, &c., is performed.

The average size of the huts is—length, 10 feet, by 5 feet wide, height, 5 feet to the spring of the roof, and 10 feet to the ridge; the roofs are made particularly steep, to throw off the rains.

In some towns the huts are built of mud, but the roofs and the plans are the same as above.

They build their towns and villages without any attempt at regularity, and generally in the vicinity of water and plantain fields; but often all their plantations are away miles from their villages.

Prahsu was well situate for water, the water of the river being good and plentiful. The bank on which the town is built is about 25 to 30 feet above the bed of the river, and the river is at the town 50 yards in breadth; in the dry season it is fordable, but in the rains it rises to 15 feet or more in depth.

When we arrived at Prahsu, the river was at its lowest, and the water clear; the town was almost hidden by plantain trees, which grew right up to the huts in great profusion, and enormous forest trees overshadowed the town.

The troops took possession of the huts already built, and immediately were set to work to cut down the plantain trees and clear some of the adjacent forest. The men had brought up with them the French tentes d'abri, which they now pitched on the ground just before occupied by the plantains. These tents, it is hardly necessary to say, are entirely unfit for any work but marching, they never were intended for permanent occupation. Here necessity compelled them to pitch their tents down on rich damp and deep soil, with the numerous stumps of plantains rotting all round. The men, as soon as they could, commenced to build themselves huts; but these huts, built in a hurry and without experience of the native ways, were utterly useless to keep their occupants dry.

The natives dry and smoke the thatching before using it, and the floors are made of clay brought from some distance; all this was out of the question in building huts and hospitals, which were required at once.

Consequently our roofs were as soon as laid on (green) attacked by insects; they contracted, or rather shrank up, and left large holes, and everywhere allowed the rain to come in. The floors were damp; after rain they became a mass of mud and water.

These grave defects in lodgings, with the unequalled injurious effects of living in the centre of a vast forest, close to and on the bank of a river, surrounded on all sides by dense jungle growth, very soon seriously affected the health of the men and officers.

As the consideration of these circumstances forms the key to the subsequent great sickness amongst the troops, I have been compelled to dwell upon them longer than perhaps their importance would otherwise warrant.

It may be asked why the men were not set to clear the decayed stumps of plantain trees away; but it is to be recollected that the whole of the commissariat stores, military stores, hospitals, &c., &c., had first to be built; even previous to commencing them ground had to be cleared and levelled, this work in a country like Africa can only be understood by those who have seen it, huge trees with trunks six and eight feet diameter, and tangled underwood of centuries of growth, are not easily cleared away.

As soon as possible the men were set to clearing away the offending stumps of plantain trees, the sappy nature of which caused them soon to give out most offensive odours. Well, this work of building huts for hospital use, stores for the fast increasing supplies of material of war, of clearing ground for a stockade, cutting trees to form it, cutting drains, clearing away rubbish, &c., gave the men hard and constant employment for the first five weeks, so much so, that the midday fatigues had to be left off, as large numbers of them were daily going sick with fever.

Although the fatigues were lessened the work was very constant; the first showers showed us that all our roofs were utterly useless to keep out the rains, which, in the first week of March, became pretty frequent.

The rains on the coast are said to begin generally in April or May, anyway March appears to be the extreme early, as June is the extreme late date of their commencement.

However, the preceding wet season had been an unusually dry one, and, according to the laws of compensation which are said to govern the seasons, the rains in 1864 should have been looked for earlier, and have been expected to be heavier.

On the coast, that is the seaboard, the rains are very irregular, and often it is there very dry when very heavy rains are falling in the bush. This is probably caused by the great flatness of the land close to the sea. In the interior the rains commence undoubtedly earlier than on the coast.

At first the excitement and novelty of the situation appeared to keep the men up under great and constant fatigue; but as this excitement wore off, and was not replaced by any other, there appeared a great depression among them; the constant toil in excessive heat soon began to tell on the health of the troops, and they came faster to hospital than we could find accommodation for them.

By the first half of March there were more than fifty men in hospital; several of the officers had already been attacked by fever, and one, Captain Gabb, 4th West India Regiment, died on his way to the coast. Lieutenant-Colonel Conran, 4th West India Regiment, who had never been well since his arrival, left in February for the coast, and never after returned: indeed no officer who went down sick recovered sufficiently to return to the camp.

Towards the middle of March, the rain which had so often threatened began to fall in heavy squalls, with storms of thunder and lightning almost every night; these small tornadoes were convincing proofs that the weather was breaking. Meanwhile the heat had been daily increasing, the sun had entered on his northern course, and was daily becoming more directly over head. We found that cutting and clearing the bush away allowed the sun to bake the clay soil, and the radiated heat consequent on this made it impossible to work in the daytime.

The heat was excessive in the daytime, and at night the damp chills caused by rain or fogs were most trying; and undoubtedly this variation in temperature was a most fruitful source of disease. It must be remembered that every one in the camp was exposed to the full power of the miasmatic exhalations which arose from the surrounding forest and river and settled over the camp; in huts built of lattice-work on the ground, and without good roofs, there was no protection from the baneful night air.

I marked the thermometer as follows, the glass being hung up in our coolest retreat, and about five feet off the ground—of course under cover: Morning, 9 to 11 o'clock, 84° to 86°; 11 A.M. to 2.30 P.M., 90° to 96°; 8 to 9 P.M., 80° to 76°.

Sometimes during a storm of rain at night the glass marked 74° and even 72°, making an average range of 20°, and an extreme range of 24° in the twenty-four hours.

About sunset a dense fog would begin to rise from the river, which hung over and round the camp during the night; towards morning it became condensed on the surrounding trees, and thence again would rise with the early morning sun, making the nights chilly and damp and the mornings foggy.

The duties of the troops consisted of a guard-mounting of 21 men, and a picket of 50 men; there were 7 sentries posted round the camp, on the verge of the forest; the men on guard and picket suffered very much from the cold and damp night air. Then there were constant fatigue duties; the work of re-roofing and repairing huts seemed never ending; then additional huts were being required for hospitals; drains to carry off the heavy rains that were now becoming more and more constant; urinals, latrines, &c., all gave the men ample employment.

A large party of men were employed cutting trees on the Ashantee side of the river, for the purpose of making a bridge; but, after the expenditure of great labour and time in this work, the whole of the timber was swept away by the rapidly rising river before the end of the month (March).

By the end of March there were between 80 and 90 in hospital out of an entire force of 360 men; but besides there was a large number of the men sickly and weak, constantly going sick, but there was no hospital accommodation for such a number. It was never contemplated to have permanent hospitals established in the bush; and even if so there was not at Cape Coast at that time equipment for an hospital of 50 men.

Hardly an officer was in sound health by this time, and none had escaped the fever. As already stated, Captain Gabb had died on his way down in his hammock, and with none but natives near him. Staff Assistant-Surgeon Hooper also died just as he reached the coast from the bush. These things, with the fast increasing list of sick men and officers, served to augment the depression among those who remained in the bush, and by the 1st of April 11 officers had gone down to the coast sick.

The hospitals were now overcrowded,—the men suffering from fever, diarrhœa, and dysentery, and lying on the damp ground, in many cases with pools of water around them. It became utterly impossible to make sufficient accommodation for the number of sick.

The rains had fully set in, and storms of thunder, with furious rains, soon turned the camp into a large swamp; the roads became flooded, slight streams were turned into torrents, and the rivers were impassable until canoes were sent up from Cape Coast, and then the sick had to be ferried over two and two.

On the 9th April, 1864, the troop ship "Tamar" arrived off Cape Coast Castle with reinforcements, consisting of the left wing, 4th West India Regiment, and two companies, 1st West India Regiment. As room in the Castle for this increase was impossible, all the houses available in the town were hired, and necessarily without reference to their fitness for barracks.

Arrangements were soon made to bring down half the troops from the Prah. On the 12th April I left the Prah with the two companies going down, and 15 of the worst cases out of the hospitals. We reached the coast on the 18th of the same month, with the loss of only two men by the march, both of dysentery. The march down was trying to the strong and healthy—much more to the weak and sickly. The roads were mostly under water, and extensive detours were required on account of swollen streams, enormous trees, blown down since the commencement of the rains, blocked up the road in many places.

Accommodation along the road there was none; even drinking-water was scarce and often bad, and the last two days were spent without any but what was carried in the tins.

At the coast there was a great amount of sickness, the officers sent down from the bush were stalking about the Castle like skeletons, gaunt and emaciated; and so firmly had the fever taken hold of them, that I believe there was but one exception to the statement that all sent down sick with fever or dysentery from the interior who did not die, had their diseases so persistent that they required to be sent home, and many even suffered from severe attacks at home of the disease contracted in the African bush.

The fresh arrivals were suffering quite as severely as those who had been exposed to the noxious influence of the bush. The detachment 1st West India Regiment sent a great number of old cases of chronic rheumatism into the hospital, and the left wing, 4th West India Regiment, who had a number of young men, suffered mostly from fever on their arrival.

A detachment of the troops lately arrived were sent up to relieve the men remaining at Prahsu and Swadroo. Thus in the middle of May all the troops who had gone first to the camps were relieved by the new arrivals.

The weather had become more unhealthy, and, as a necessary consequence, the camps had become worse and worse, the whole of the neighbourhood of Prahsu camp was under water; the roads were more difficult for marching. Fresh vegetables, fresh meat, and good water were all exceedingly scarce and insufficient at Cape Coast.

The hospitals were overcrowded; ill suited as they were in every single respect for use as hospitals, when they became crowded with fever and dysentery patients, they were utterly unfit for a convalescent patient. There was no help for this—no other house in the town was then available. Many schemes were planned for erecting temporary huts for hospitals, but none could be adopted for want of materials. There were in this month of May 80 men in hospital, and 18 officers on the sick list at Cape Coast alone, besides a large number of men sickly and weakly allowed to be on the convalescent list, quite unfit for duty, and unable to be admitted to hospital for want of room.

Of the Medical Staff, Staff Assistant-Surgeon Hooper had died just as he reached the coast from the bush, Staff Assistant-Surgeon John Greig died also from the effects of the bush fever and dysentery, and Staff Assistant-Surgeons Lewis and Oughton had both been invalided home for fever and dysentery contracted in the bush. This left the Medical Staff at this time very shorthanded.

During May, fever and dysentery were exceedingly prevalent among both men and officers; the newly-arrived troops suffered, perhaps, most. The 1st West India Regiment detachment had a large number of old rheumatic cases, which bad barrack accommodation greatly aggravated. The detachment 2nd West India Regiment suffered least of all; they had been on the coast a considerable time, and had lost all their weakly men, or had become hardened or acclimatized. The left wing 4th West India Regiment and detachment 1st West India Regiment brought a great number of men suffering from chest diseases on shore, which were at once admitted to hospital, and many more applied afterwards for admission with pneumonia, pleuritis, and acute bronchitis. These chest affections were contracted on the transport ship "Tamar," when she ran up into cold latitudes to get wind. Many of these cases contracted dysentery while in hospital, and died.

The camp at Swadroo was all through much healthier than that on the Prah. This is to be accounted for by the fact that the company, 4th West India Regiment, sent there were from Accra, and were picked men. Also Swadroo is much better situate for camping ground than Prahsu; it is on a slight elevation, and about a quarter of a mile from the river. Then the number of men was much smaller, and they were able to hut themselves better than we were at the Prah, and for the greater part of the time at the Swadroo camp fresh vegetables and fruit were obtainable. All these conditions were reversed at Prahsu; there the camp was just on a river, closely surrounded by enormous forest trees of 100 and 150 feet high, with thick jungle growth below; and fresh fruit or vegetables were never obtainable—even yams had to be brought from long distances. And again, Prahsu being the main point of advance, or the head-quarters of the expedition, more men were intended for it, and more accommodation required for stores, &c.; thus the men had more to do, clearing ground for the expected reinforcements, &c.

Early in June the sickness at the Prah camp had increased so much that half of the entire detachment (200 men) were sick; the rear of the camp was flooded by the heavy rains, and several of the officers who went up in May were sent down sick, besides leaving others ill there. As fast as hammocks and men could be obtained they were sent down with sick men, until all our hospital accommodation was so crowded that the largest room in the Castle had to be given up for the sick.

The season appeared to be unusually unhealthy; even old residents and natives complained of fever and dysentery.

This went on until the mail of the 18th June, 1864, brought the welcome orders that all the troops should be immediately brought down from the interior, preparatory to having the detachments of the 1st and 2nd West India Regiments removed to the West Indies, and part of the 4th West India Regiment to Lagos, thereby lessening the extreme overcrowding in the barracks, hospitals, &c.

Orders were at once sent up to have the stores destroyed and the men brought down.

By the June mail I was relieved of the medical charge of the troops on this coast.

This brings us to the close of the expedition; and I will now go back to the "Effects of the Climate on the Expedition."

All West Indian soldiers suffer greatly from change of climate. Many, if not most of the 4th West India Regiment suffered more from the effects of this climate on their first arrival than white men would.

Thus the 1st detachment of the 4th West India Regiment landed on the coast in August 1863, and were at once attacked by fever and dysentery; before December of same year they had somewhat recovered (by no means wholly), and then were employed in the interior, the inevitable results of which following so soon on constitutions lately shaken, told with most serious effect.

Had the wet season of 1863 been otherwise than unusually dry, it is hard to suppose what state the right wing would have been in by the winter, because September is always considered here the worst month of all, and rightly so, as by that time the whole of the vast wooded interior has become saturated with water, vegetation is rank, and the sun has become almost perpendicular (the hottest month of the year), and the land wind sets in with regularity and force, bringing down the seeds of fever with it in attendance; but fortunately, in one sense, the season previous to the arrival of this new regiment was exceedingly dry.

That West Indians suffer very much on their first arrival in Africa is an understood fact. Captain Trotter states, in his Parliamentary Report of the Expedition of 1841–42, "that the constitution of the negro, whether of African or American birth, requires an habitual residence in Africa to be exempt from the fever of the country. This is found to be the case in Liberia with the emigrants from North America; they all, with few exceptions, have fever on their arrival, and many die; but those that recover are said to stand the climate afterwards."

This was fully borne out by the difference in the health of the 4th West India Regiment and that of the detachment of the 2nd West India Regiment, both being subjected to the same influences.

It appears almost unnecessary to go on to mention other causes predisposing to disease; but it may be added that the men had heavy duties to perform; also that their food was by no means as good as they had been accustomed to; and lastly, that when sick they had little chance of recovering in hospital huts built up much the same as their own—in some cases with pools of water close to them.

But the fact that the 2nd West India Regiment made a so much better fight against the effects of the climate points to some other cause for the manner in which the 4th West India Regiment gave way; for fight against the climate they made none; and this other cause is to be found in the composition of the force sent to the Gold Coast to carry on the expedition.

COMPOSITION OF THE FORCE.

As before stated, the force employed in the expedition consisted of the 4th West India Regiment, the right wing of which landed in August 1863, and the left wing in April 1864, in the midst of the rains; of the two companies of the 1st West India Regiment landed with the last from the West Indies; and two companies of the 2nd West India Regiment which had been brought up in 1862 from the Gambia to the Gold Coast to take part in the first expedition under Major Cochrane, of the Gold Coast Corps. This last detachment was composed of old soldiers, and fine, strong, hardy men, who bore the climate and exposure in the bush well.

The 4th West India Regiment was not twelve months in existence when sent on active service to the Gold Coast. The recruits were obtained in Barbadoes and Jamaica, and were to a great extent young and unformed, and many of them weakly men; and another portion of the regiment was formed of old men, wretchedly weak and worn out, sent from other West Indian regiments to form a nucleus for the new corps; such men are always the weeds of their own corps.

Thus the 4th West India Regiment was composed partly of men too old, and partly of recruits too young; the latter perhaps in some years time, would have made average black soldiers, but before being accustomed to soldiers' life were sent here, and were soon attacked by fever, which weakened the little strength they had, and left them utterly unable to withstand the effects of the exposure and privations of bush life.

I cannot but consider,—and I think any one who saw how unable the young soldiers of the 4th West India Regiment were to stand hardships or extra labour of any kind will agree with me—that the corps was unfitted by its late formation and the materials of which it was composed, for active service so soon; and certainly this regiment, of all the West India corps, was the least capable of sustaining the effects of African climate.

It is not new information that West Indian negroes suffer severely from the change from their own to the African climate. Knowing this, it would have been wiser to have sent older soldiers to the Coast. And again, at Cape Coast there was only barrack accommodation for 200 or 250 men, and the native houses were quite unfit for use by troops. But it appears as if the addition of the left wing was never expected, for from August 1863 to April 1864 no means of lodging them was prepared; and when they did come, not alone, but with a detachment of the 1st West India Regiment, they had to be put into houses through the town wherever and however available, without consideration, as I before stated, for their suitability in any particular.

The detachment, 1st West India Regiment, was, on the other hand, composed of an aggregate of the oldest men I have ever seen in any one regiment. They were, in point of fact, half of them invalids; most of them had chronic rheumatism and such like complaints. When they were inspected for marching to the front, a large number, who did not complain, were left behind as unfit, really old worn-out soldiers. These men, and the left wing 4th West India Regiment, helped most materially to overcrowd our hospitals.

As might be expected, when these men went up to the camp in the middle of an unusually heavy rainy season, they soon gave way, and filled the miserable attempts at hospitals at that station.

Thus, as I have attempted so show, the composition of the force employed was such as entirely unfitted them for the hardships attendant on an expedition in a climate and country like this; and more, that West Indian soldiers are less able to bear sudden removal to the Coast than even white soldiers, and least of all to bear such removal in the least healthy period of the year; and that neither white nor black soldiers can stand being quartered in ill-constructed huts in the interior of an African forest during the wet season, is a matter of notoriety.

West Indian soldiers in the West Indian islands have invariably good barracks, good water, and food; their duties are never very onerous, and the climate is their own; fruit, vegetables, fresh meat, milk, and good water are all common daily necessaries with them. When they land at Cape Coast the case is reversed; they have no abundance of fresh water (in Cape Coast Castle it has been for the last year and a-half served out in small quantities, sometimes as little as one quart per diem), fresh fruit is very rare indeed, and not easily attainable by the soldiers; fresh vegetables are confined to yams and sweet potato, and during the rains these are not to be had in sufficient quantity; and fresh meat can never be had except as imported, and as there is no regular trade of cattle to Cape Coast, the supply of fresh meat (one of the most important articles of food) is most irregular, and cannot be depended upon. Until last year the men were not supplied with bread, as no bakery was in operation until then—at least so as to give them a proper supply.

All these privations, added to very inferior barrack accommodation, have to be considered in estimating the effects upon the health of West Indian soldiers of the change of climate from their own country to the Gold Coast.

However white soldiers might be able to bear up under hardships and changes of climate, even on this coast, black troops cannot without considerable loss; they have none of the hardihood and spirited endurance of the white man. All who know anything of black troops are aware of this. It has often been remarked that if a West Indian soldier goes to hospital sick with anything serious, he gives up all hope directly. I have frequently been greatly perplexed to account for my patient dying under no more than an ordinary white soldier would battle with for weeks, if even then he succumbed; in the one there is abundant nervous energy, lively hope under the most depressing circumstances—what is commonly called pluck—and that is a great help to a sick man; but in the other case there is no hope to keep him up—no rebound, apparently no reaction. The black man goes sick to hospital, is perfectly quiescent and contented, perhaps reads his bible or prayer-book all day; but expresses far less interest or anxiety about himself than his doctor does, and if he does not soon get better he makes preparation for his death by disposing of his little property. This I have known over and over again, even when I had no anticipation of a fatal termination of the case.

This is, perhaps, partly to be accounted for by the fact that West Indian negroes are accustomed from the earliest age possible to indulge unrestrictedly in sexual intercourse. When soldiers they all have their concubines just as if married, and I think such unlimited indulgence not unlikely to produce, or help in producing, the apathy which is so marked in their character. But independent of that, apathetic indifference to the future is inborn in the African character; it is seen here in all of them; the best educated show it, and their consanguineous brethren of the West Indies have not lost that characteristic.

CHARACTER OF THE DISEASES FROM WHICH THE TROOPS SUFFERED.

The diseases from which the troops suffered on the coast and in the bush were the ordinary diseases of this climate and particular season of the year; and the severity of these climatic diseases was only what was to be expected from the combination of favouring circumstances presented for their operation by the composition of the force, inferior diet, barrack accommodation, &c.

The diseases were almost entirely of the zymotic class—paludal fevers, diarrhœa, dysentery, acute and chronic rheumatism, liver affections, and anæmia (the last two arose always in connexion with intermittent or remittent fevers). The above, with dracunculus, include all those strictly of climatic origin. In addition there were three cases of delirium tremens, and many of acute inflammations of the chest. The latter, as before stated, were entirely adventitious cases; they all occurred among the new arrivals, caused by the transport ship which brought them having to go up north into cold latitudes to find a breeze.

There is very little to say about those diseases; the fevers were aggravated by residence in the midst of the source whence the poison originated; and the men being attacked so often, their systems became saturated with it, and thence arose the anæmia, shown by wasting of the body, dropsical effusions into serous cavities, loss of strength and appetite; the sufferer, still unremoved from the influence of the poison, had no chance of recovery, and it was these cases chiefly that suffered from dysentery.

The acute cases of rheumatism occurred mostly at the Prahsu camp, and the chronic cases at Cape Coast, among the men of the 1st West India Regiment detachment.

The cases of Guinea worm presented no features worthy of particular notice; they often left troublesome ulcers behind.

With respect to the water supply at Cape Coast, it has often been urged that a system of pipes from the town to the "Sweet River," a stream about eight miles distant, would give a good and plentiful supply.

A steam condenser will never be a successful substitute; the difficulty of keeping the machinery in good order, and the great expense of bringing coals out here for it, and without which it cannot be worked, will prevent it ever yielding a good result. Even to large tanks, as they are here constructed, there is objection; iron tanks built on the surface of the ground are much preferable; but a series of tanks made of iron, as used in most of the West India islands, would afford abundance of water for drinking and cooking, if the roofs were sound and the pipes perfect.

That rain water could be collected in abundance for all the wants of the troops at any of the stations on this coast, is proved by the fact that many of the merchants here not only collect water sufficient for their own use, but to supply the trading vessels also. When the great difference between the area of the extensive roofs of the Castle and those of the largest merchants' houses in the place is considered, this will be at once understood.

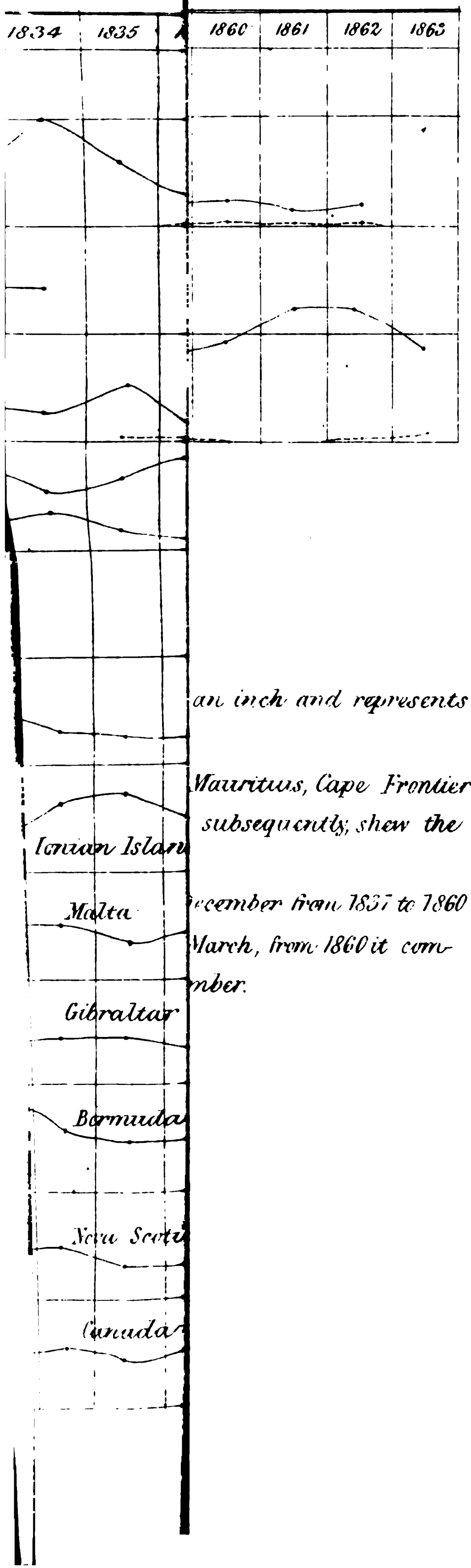
CAPE OF GOOD HOPE COMMAND.

[The sanitary circumstances in the Cape of Good Hope Command during 1863 have afforded but few changes, and none requiring special notice. The following concise report has been received from the Principal Medical Officer.]

REPORT ON THE PREVALENCE OF OPHTHALMIA IN THE CAPE OF GOOD HOPE COMMAND IN 1861, 1862, AND 1863, WITH REMARKS ON THE ALLEGED CAUSES.

By Deputy Inspector-General LAWSON.

INVESTIGATIONS into the causes of diseases of the eyes in the Army have hitherto been based on facts derived from too limited an area, and from too short a period of time. Had the examination embraced different countries and a longer period, it would have been found that this class of diseases varied much in frequency at the same place, at different times, and at different places at the same time; though many of the circumstances to which the men were exposed, and to which affections of the eyes have been attributed, remained with little or no change, for many years in succession, at each or several of the places where such different results were obtained. To show this, I have calculated the millesimal ratios of the admissions from ophthalmia for each year, at most of the stations occupied by the British Army, from 1817 onwards, from the data in the Statistical Reports, and have added those for the Cape since 1846 from the returns in the Principal Medical Officer's office, and those for the Mauritius from a manuscript return with which I have been favoured by Dr. Gordon, Deputy Inspector-General, now at the head of the Medical Department there. These are given in Table I. To show the fluctuations more clearly, and to facilitate the comparison of one station with another, I have projected the numbers roughly on the accompanying diagram. In this, the space between each horizontal line is one inch, and represents 100 admissions per 1,000 of the mean strength under observation; 2 inches represent 200, and so on. The vertical columns represent the years, and the dot in the centre of each the position on the scale of the number of admissions for that year, while



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the curve joining these conveys a clearer notion of the fluctuation of the disease at the same station, and its presence at different stations, than can be obtained from perusing the Table merely.

The first impression derived from the diagram is the great difference in the prevalence of ophthalmia at all the stations in different years; and a detailed examination shows that in Ceylon and Canada only has the range been less than in this Command. It will be seen, also, that there were certain periods during which there was a comparative quiescence in the force of the causes of ophthalmia, and others, again, in which these had their activity enormously increased, and that both the quiet and active periods are not confined to one station, but may be traced more or less distinctly from Jamaica to Malta, and from Ceylon to Canada. Taking the Cape and Mauritius, their causes, though not coinciding completely, still show a general agreement, and a rise in one may generally be detected in the other, though, from local circumstances at the time, it may have become more developed sometimes at the one station, sometimes at the other.

These facts indicate that, in the production of ophthalmia, as with fever and cholera, there is a cause concerned of a very influential nature, and of far more extensive operation than any connected with a particular station or garrison, and, unless its operation is allowed for, no real advance will be made in estimating the importance of the ordinary exciting causes to which the origin of the complaint is more commonly attributed.

My predecessor, Inspector-General Taylor, entertained the opinion that the prevalence of ophthalmia in this Command was due to a generally-diffused scorbutic taint among the men. Now we have no means of testing the amount of this taint unless by the admissions into hospital from scorbutic complaints, and though there may be a certain disposition to scurvy without its being so developed as to lead to admission to hospital, it is clear that where numerous admissions take place, the disposition is both more strongly developed and more widely diffused than when the admissions are fewer.

Taking the admissions from scurvy, therefore, as the test of the diffusion of the scorbutic taint, I have reduced them, for this station and Mauritius, into the form of millesimal ratios for each year. These are given in Table II, and have been projected in the diagram and joined by a dotted line. From this it is obvious that, at Mauritius, the highest points in the curve of ophthalmia correspond with a complete absence of scurvy; and though ophthalmia was more prevalent than at the Cape, at no time was scurvy so common as at the latter. The same applies to the Mediterranean and West Indies, where scorbutic complaints are very rarely met with in the ordinary course of garrison service. The first considerable increase of scurvy at the Cape, 1837-9, was not attended with much ophthalmia. The second, in 1846, corresponded with a high rate of ophthalmia; but nearly as high a rate had existed for two years before with very little scurvy; and 1852-53, with the greatest frequency of scurvy recorded in the returns, ophthalmia was at its lowest point for the last twenty years. The great increase of ophthalmia in this Command in 1860-61 was not attended with actual cases of scurvy. The conclusion, therefore, is inevitable, that though scorbutic taint may aggravate ophthalmia, yet that form of disease, as it has appeared among the troops, originates from causes altogether independent of those of scurvy. It will be seen by Table I and the diagram that the admissions from ophthalmia in 1863 amounted to 90 per 1,000 only, as against 121 and 122 the previous years, and even this smaller number has been much augmented by the liability of persons who had once undergone an attack to relapse on trivial exposure, such as would not have induced one in healthy men. The great majority of the admissions occurred in the 2nd Battalion 10th, 2nd Battalion 13th, and 85th Regiments, and Cape Mounted Rifles. In the 2nd Battalion 5th, which relieved the 85th in the end of April, there were 15 cases only to 31st December, or in the ratio of 25 per 1,000 of mean strength per annum; and in the 96th, which relieved the 2nd Battalion 13th in the end of March, 8 cases, or 14 per 1,000 per annum.

The force of the causes of this form of disease, therefore, in the year just finished has been much less than in either of the two immediately preceding,—a fact which will explain, in part, some points dwelt on in the statements of the various Medical Officers.

The strength at each station, omitting some trivial details, with the numbers of admissions from ophthalmia, and those remaining, have been taken from the weekly returns of sick, commencing with that for 5th July, 1861. These have been put together for the years 1861, 1862, and 1863, and, as the first period embraces six months only, the admissions were doubled to render them comparable with those for the other period. These numbers, reduced into the form of millesimal ratios, are given in Table III. From this it appears that the only stations where the admissions from ophthalmia have not amounted to 50 in the 1,000 of mean strength are, for the Infantry, Cape Town and Fort Buckingham in Natal; and for the Cape Mounted Rifles, Graham's Town and Fort Peddie. Port Elizabeth, Fort Beaufort, Dohne, and D'Urban in Natal, were low, two out of the three years, among the Infantry, and Cape Town among the Cape Mounted Rifles. East London, which was specially recommended by Staff Assistant-Surgeon Jennings, from his short experience there with the 2nd Battalion 5th, so far from being free from the causes of this disease, suffered more, in 1861, than many of the other stations, and in 1862 was exceeded by the small posts of Dohne and Lower Zugela only among the Infantry, and King William's Town among the Cape Mounted Rifles. The high ratio of 66 per 1,000 at East London, for 1863, is almost entirely attributable to the 85th, which was quartered there until the end of April, there having been 21 admissions among them up to that time; while among a somewhat greater strength of the 2nd Battalion 5th, which occupied the post from May to the end of the year, two cases only occurred. That the immunity of the 2nd Battalion 5th at East London, however, cannot be set down to the local advantages of that station, is obvious from their predecessors having had so much ophthalmia, and this immunity has been found equally in Natal, in the remainder of the 2nd Battalion 5th, and at the various stations occupied by the 96th. The absence of the disease must, consequently, be attributable to the cessation of something of far more extended operation.

The corps which were in the Command from 1861 were, the 85th Regiment, which arrived in August 1857 from Mauritius; 2nd Battalion 13th, which arrived in April 1859 from England; 2nd Battalion 10th, which arrived in March 1860 from England; and the 2nd Battalion 11th, which arrived in September 1861 from England.

Of these, the first three quartered on the frontier and at Natal, where the disease was most prevalent, suffered severely, while the 2nd Battalion 11th has had very few cases, though a wing was quartered at Fort Beaufort and Middle Drift from March 1861 to April 1862, while the other three corps had numerous admissions.

The Cape Mounted Rifles being a local corps, it is difficult to form any estimate of the period its men may have been in the country.

As to the various causes assigned by the Medical Officers for the prevalence of ophthalmia, it is probable that each or all may have had something to do with its origin at different places and times; but there is still something wanted to account for its irregular outbreaks, and for its irregular appearance among different descriptions of force.

Thus the millesimal ratios of admissions were—

		1861.	1862.	1863.
At Graham's Town ..	Infantry	244	107	58
	Cape Mounted Rifles ..	81	36	46
At King William's Town	Infantry	122	189	124
	Cape Mounted Rifles ..	224	253	291
At Fort Beaufort ..	Infantry	64	47	5
	Cape Mounted Rifles ..	64	157	249
At Keiskama Hock ..	Infantry	95	147	53
	Cape Mounted Rifles ..	..	..	231
At Fort Peddie	Infantry	221	..	..
	Cape Mounted Rifles ..	48	..	..

So that, in 1861, with a very high ratio of attacks among the Infantry at Graham's Town and Fort Peddie, there was a very low one among the Cape

Mounted Rifles. At Fort Beaufort, the attacks were about twice as numerous among both descriptions of force as among the Cape Mounted Rifles at Graham's Town; but at King William's Town the attacks among the Cape Mounted Rifles were about as numerous as among the Infantry at Graham's Town. In 1862, the disease was less prevalent among the Infantry at Graham's Town and Fort Beaufort; but while the Cape Mounted Rifles at the former continued to show a low ratio, at Fort Beaufort it had more than doubled, the increase commencing in June, coincident with a large addition to the force there. The Infantry at Keiskama Hock had a large increase of ophthalmia this year. At King William's Town both description of forces showed much higher ratios. In 1863, the 96th Regiment occupied Keiskama Hock and Fort Beaufort for nine months and Graham's Town for seven months, which will account for the much less prevalence of ophthalmia at these stations among the Infantry than in King William's Town which was garrisoned by the 2nd Battalion 10th; but even then it was far less frequent among them. In the Cape Mounted Rifles, however, though at Graham's Town there was very little addition to the number of cases, there was a very decided increase at the other three.

The conclusion from all the facts above detailed must be that, among the Infantry, the causes of ophthalmia were much less active in 1863 than in 1861 or 1862 all over the frontier district and at Natal; consequently, that the main cause was of very extended operation, and quite independent of local circumstances. The greater frequency of the admissions among the men of the Cape Mounted Rifles at Fort Beaufort, Keiskama Hock, and King William's Town in 1863, must be owing to some peculiarity affecting them alone.

The first cause of pretty general operation which attracts attention was the remarkable dryness of the atmosphere and scantiness of rain in 1861–2, which permitted of the formation and diffusion of an unusual amount of dust, the application of which to the eyes, as is well known, will often cause inflammation of them. On the occurrence of rain early in 1863, this source of the disease became much less, and so far undoubtedly favoured the diminution which followed. But too much weight must not be attached to this cause, as it is quite insufficient to account for the very different rates of prevalence at different stations, or among the two descriptions of force at the same station; and at Natal, where the drought was not experienced to any extent, a similar amelioration is found in 1863.

Dr. L'Estrange assigns want of ablution accommodation as a cause of the disease among the Cape Mounted Rifles at Fort Beaufort, and instances the absence of it in the 96th, which have an ablution-house, in support of this view. Now, the ablution-house attached to the Infantry Barracks there was built in 1863 only, the supply of water for ablution was derived, both before and since, from the aqueduct close to the barracks. The aqueduct does not reach the Cavalry Barrack, and the means of ablution there have been the same during the three years. Yet the annual millesimal ratios of attacks among the Cape Mounted Rifles rise from 64 to 157 and 249, while, in the Infantry they fall from 64 to 47 and 5, the conditions as to ablution virtually remaining unaltered. Extending the examination to other stations, it is found that at Kieskama Hock there were no lavatories during the period, and the supply of water was obtained from the same source the whole time.

The same is found at Dohne, Windoogelburg, and East London, and Fort Napier, and Lower Zugela in Natal. Yet at all these stations the disease was much more severe in 1862 than 1861, and at all it was much reduced in 1863. At King William's Town there is a lavatory for the Infantry Barracks, the supply of water for which was obtained from the aqueduct, while that was available, but during the severe drought up to the end of 1862, it had ceased to run, and water was obtained from the river by carts; in the Cavalry Barracks there is no lavatory, but basins were available, and water obtained in a similar manner. Yet the frequency of the disease among the men of the two corps was very different, and even among those of the Cape Mounted Rifles, with the same means available during the three years, went on increasing from 224 in 1861, to 291 in 1863.

It is very desirable that ample means of ablution should be available in every barrack, and I have no doubt the proper employment of them will tend to reduce the frequency of the attacks of ophthalmia, and to facilitate the recovery of convalescents; but, with the facts just given before me, I cannot come to the conclusion that the want of ablution rooms had been an active cause of the disease among the Cape Mounted Rifle Corps at Fort Beaufort, or at Keiskama Hock, or King William's Town.

The use of metal basins is assigned by Dr. Jennings as a cause of the disease among the 2nd Battalion 10th Regiment at Graham's Town; but he does not state in what condition these were. In the course of my inspections I have frequently found the metal basins so thickly coated with soap and dirt, both outside and in, that it could be scraped off in thick masses; basins in this condition might prove injurious, but what we have to consider here is whether basins to which reasonable attention has been given, are likely to be so. Metal basins were in use at Port Elizabeth, in the lavatory attached to the Cape Mounted Rifles Barracks at Graham's Town, and in the Infantry Barracks at Fort Beaufort, both before the erection of the lavatory and since; at Keiskama Hock, in the lavatory at the Infantry Barracks at King William's Town, at the encampment at East London, D'Urban, Fort Napier, and Lower Zugela, and yet at all these places ophthalmia diminished in 1863, notwithstanding the use of the basins which Dr. Jennings supposes produced it in the 2nd Battalion 10th Regiment in 1862. At Dohne and Windoogelberg, where the men were in the habit of washing in the aqueduct, without using basins at all, the same increase in 1862 and diminution in 1863, was found. These facts admit of no other conclusion than that metal basins, if properly cleaned, are inoperative in causing the disease, and indeed in the whole course of my service I never heard the point suggested before as against metal basins in a proper state as to cleanliness.

From some representations by Assistant-Surgeon Knaggs, Cape Mounted Rifles, to the officer commanding that corps at King William's Town, it appears that, latterly at least, the men were in the custom of using the stable buckets for personal ablution, which were also employed for washing their accoutrements; whether this practice had been general in the corps, or how long it had prevailed, I am unable to say; under any circumstances it was reprehensible, but, with the liability to ophthalmia in that regiment, it was of the first importance to stop it.

Deficient ventilation and overcrowding has been assigned as a cause of the prevalence of ophthalmia by Dr. Jennings. On examining into this it is found that at Middle Drift, Dohne, and Windoogelberg, where the average cubic space per man varies from 240 to about 300 feet, and the means of ventilation are limited, there was much less ophthalmia in 1861 than at Graham's Town, Keiskama Hock, and King William's Town, where the average was from 500 to 600 cubic feet, with equally good, if not better means of ventilation. In 1862 the former group did not suffer more from disease than the latter, and in 1863 they were again more free from it. Overcrowding and deficient ventilation, therefore, cannot with justice be assigned as active causes of the disease, as it prevailed in this Command since 1861.

The ventilation in most of the wattle and daub huts on the frontier is managed by windows on either side of the rooms, and by a space being left clear round the eaves, between the wall-plate and the roof. Both methods are objectionable, as little change of the air in the rooms takes place, unless there be a breeze outside, and if there be, the men are either constantly in a draught, or they close the apertures by which air is admitted, and stop the ventilation altogether. Sleeping in such draughts in warm weather I believe to be a frequent cause of ophthalmia, especially when much dust is blowing about. It would be well, as insuring better and regular ventilation, that all huts should have sufficiently large openings on each side of the ridge, and that these should have shutters inside, either of which could be closed to exclude wind or rain, having the others open for ventilation. In more permanent buildings, revolving metal ventilators might be better, as lately put up in the main barrack at Cape Town.

Another point which has been mentioned is whether the want of peaks to the caps of the Cape Mounted Rifles might not, in their case at least, have increased the frequency of the disease. This corps has not worn them for four years past, and the very small amount of disease among the men at some of the stations, as shown in Table III, is satisfactory evidence that the want of them has not predisposed them particularly to it; but, on the other hand, after a man has once undergone the attack, the greater exposure of the eyes to the sun and dust without the peak is more likely to induce a relapse, and it is reasonable to conclude that the greater frequency of the complaint in 1863 at Fort Beaufort and King William's Town, while it was diminishing everywhere else, was in some measure due to this circumstance.

Exposure on guard is another of the causes assigned by Dr. Jennings, I have met with several instances, some of them among the invalids of the present season, who distinctly refer their first sensation of uneasiness to a night guard; but with this, as with all the other supposed sources of the disease, it was comparatively harmless in 1863, though the guards were much the same as in 1861 or 1862.

One cause of ophthalmia in the Army has not been alluded to by any of the Medical Officers, viz., tampering with the eyes; it is very difficult to ascertain how far this may have augmented the numbers who came under treatment, but I have been led to understand that it was not altogether inoperative during the period under consideration. Though the practice may be and most likely is followed more or less during every visitation of ophthalmia, such wide spread effects as are shown in Table I can be accounted for only by some cause of far more extended operation than individual disposition or local circumstances.

For the general cause here alluded to there is no remedy, but it is found that its influence becomes developed among certain persons often occupying a limited space, while others in their vicinity are nearly or altogether exempt. Table III affords a good illustration of this point among the troops in this Command; all that can be done is to ascertain, as far as possible, in what condition two classes of individuals thus situated differ, and to remove or ameliorate those that appear hurtful.

From the above examination the following changes seem advisable, not that they will prevent ophthalmia altogether, but they offer the best chance of limiting it in the first instance, and favouring the recovery of those who have undergone the disease:—

1. The provision of ablution houses where these do not now exist, and arrangements for the sufficient supply of water. In connection with this, measures should be taken to insure the basins being kept clean, and the employment of stable buckets prohibited.

2. That sufficient ventilation be introduced at both sides of the ridge of all huts, with shutters within, to close on whichever side the wind is troublesome. This would permit of the space round the eaves being closed permanently, which they very commonly are by the men themselves.

3. As the want of peaks to the caps is likely to have retarded the convalescence of men of the Cape Mounted Rifles who have once undergone an attack of ophthalmia, or to have rendered them more liable to a fresh attack, that they be allowed to wear these.

4. In addition to these recommendations I have to add that I have found that when the coat collars are made tight round the lower part of the neck, they compress the veins, and prevent the free return of blood from the head, and by keeping the veins of the eyes distended, maintain a state of irritation in them; therefore it is advisable that these be made easier than they often are, or that men who have once had ophthalmia should be allowed to have the collar loose until thoroughly well.

TABLE I.

RATIO per 1000 of Admissions among White Troops from Ophthalmia at undermentioned Stations.

Year.	Mauritius.	Cape Town.	Frontier.	Ceylon.	West Indies.	Jamaica.	Ionian Isles.	Malta.	Gibraltar.	Bermuda.	Nova Scotia.	Canada.
1817.. ..	..	..	..	89	85	63	38	46	..	32	35	45
1818.. ..	2	15	..	54	48	72	47	68	43	59	35	39
1819.. ..	10	18	..	60	60	60	48	34	63	41	45	23
1820.. ..	12	34	..	78	35	93	63	66	92	60	37	17
1821.. ..	11	22	..	66	55	83	37	119	78	34	68	38
1822.. ..	15	21	16	53	50	69	22	156	126	34	75	34
1823.. ..	9	23	20	66	121	149	28	106	167	35	78	40
1824.. ..	13	12	23	100	90	132	23	523	210	66	76	53
1825.. ..	14	34	29	46	56	152	29	151	256	198	151	38
1826.. ..	58	24	29	42	66	66	30	94	178	291	16	38
1827.. ..	29	23	35	52	48	267	28	160	78	407	35	89
1828 . ..	26	61	42	69	51	164	39	95	105	230	68	70
1829.. ..	25	53	36	95	131	112	33	84	74	42	52	53
1830.. ..	27	72	85	112	232	73	82	79	91	61	32	56
1831.. ..	47	48	92	51	61	63	31	92	59	60	43	44
1832.. ..	27	36	54	67	85	49	45	59	78	60	32	48
1833.. ..	38	38	43	85	115	51	26	48	41	84	44	52
1834.. ..	101	26	38	56	127	35	65	46	41	52	48	51
1835.. ..	53	48	..	67	114	28	76	32	42	44	30	44
1836.. ..	28	8	..	84	103	32	39	44	28	43	35	52
1837.. ..	38	19	..	..	..	..	38	25	26	69	24	39
1838–39 ..	20	39	..	..	..	..	40	84	56	60	82	46
1839–40 ..	19	32	..	..	..	..	31	64	82	35	74	72
1840–41 ..	24	14	..	..	..	..	125	149	45	261	116	61
1841–42 ..	40	29	..	..	..	..	123	116	30	152	99	86
1842–43 ..	27	46	..	..	..	..	111	28	72	25	134	107
1843–44 ..	39	39	..	..	..	..	191	53	155	93	42	119
1844–45 ..	28	89	..	..	..	..	62	31	93	243	78	107
1845–46 ..	49	80	..	..	..	..	95	81	89	361	51	62
1846–47 ..	138	114	..	..	..	..	113	50	57	120	66	68
1847–48 ..	125	62	..	..	..	..	..	..	..	..	..	..
1848–49 ..	102	75	..	..	..	..	..	..	..	..	..	..
1849–50 ..	125	79	..	..	..	..	..	..	..	..	..	..
1850–51 ..	109	60	..	..	..	..	..	..	..	..	..	..
1851–52 ..	104	54	..	..	..	..	..	..	..	..	..	..
1852–53 ..	72	28	..	..	..	..	..	..	..	..	..	..
1853–54 ..	43	32	..	..	..	..	..	..	..	..	..	..
1854–55 ..	46	56	..	..	..	..	..	..	..	..	..	..
1855–56 ..	54	79	..	..	..	..	..	..	..	..	..	..
1856–57 ..	44	116	..	..	..	..	..	..	..	..	..	..
1857–58 ..	38	74	..	..	..	..	..	..	..	..	..	..
1858–59 ..	9	62	..	..	..	..	..	..	..	..	..	..
1859–60 ..	20	77	..	..	..	..	..	..	..	..	..	..
1860.. ..	22	89	..	..	..	..	..	..	..	..	..	..
1861.. ..	14	121	..	..	..	..	..	..	..	..	..	..
1862.. ..	19	122	..	..	..	..	..	..	..	..	..	..
1863.. ..	..	..	..	..	..	..	..	..	..		..	..

TABLE II.

ANNUAL MILLESIMAL RATIOS of Admissions from Scurvy among the Troops at Mauritius and Cape of Good Hope.

Year.	Mauritius.	Cape of Good Hope.	Year.	Mauritius.	Cape of Good Hope.
1818 ..	..	2	1841–42..	2	1
1819 ..	..	..	1842–43..	2	2
1820 ..	..	2	1843–44..	1	1
1821 ..	..	..	1844–45..	..	1
1822 ..	..	3	1845–46..	..	1
1823 ..	..	..	1846–47..	..	25
1824 ..	..	..	1847–48..	3	17
1825 ..	..	..	1848–49..	1	13
1826 ..	..	..	1849–50..	2	4
1827 ..	2	..	1850–51..	1	1
1828 ..	..	..	1851–52..	3	13
1829 ..	..	..	1852–53..	1	40
1830 ..	..	..	1853–54..	..	33
1831 ..	1	..	1854–55..	..	2
1832 ..	..	..	1855–56..	..	2
1833 ..	..	..	1856–57..	..	11
1834 ..	..	..	1857–58..	..	6
1835 ..	..	3	1858–59..	..	1
1836 ..	2	1	1859–60..	4	1
1837 ..	1	10	1860 ..	5	..
1838–39 ..	2	20	1861 ..	3	..
1839–40 ..	..	18	1862 ..	2	1
1840–41 ..	1	3	1863 ..	..	5

TABLE III.

RATIOS per 1000 of mean Strength. Ophthalmia.

Stations.		Admitted.			Average remaining Weakly.		
		1861.	1862.	1863.	1861.	1862.	1863.
Cape Town	Infantry..	35	34	49	2·3	1·4	3·6
Port Elizabeth	„ ..	76	21	19	7·9	1·3	..
Graham's Town	„ ..	244	107	58	28·7	7·7	2·4
Fort Beaufort	„ ..	64	47	5	4·0	2·9	..
Middle Drift	„ ..	..	92	43	..	5·1	1·7
Keiskama Hock	„ ..	95	147	53	6·6	11·8	2·7
Dohne	„ ..	31	209	17	·6	7·1	·5
Windoogelburg	„ ..	25	132	64	3·0	8·0	9·4
King William's Town	„ ..	122	189	124	9·5	19·2	8·9
Fort Peddie	„ ..	221	Troops withdrwn.	..	48·5	..	..
East London	„ ..	111	200	66	19·1	15·0	5·4
D'Urban	„ ..	143	27	21	21·4	1·4	·4
Fort Napier	„ ..	130	148	87	10·4	9·1	3·6
Fort Buckingham	„ ..	..	22	24	..	..	1·0
Lower Zugela	„	Return deficient.	253	43	..	22·9	1·5
Cape Town	C. M. Rifles	..	70	37	..	1·6	5·2
Graham's Town	„ ..	31	36	46	2·3	5·0	·9
Fort Beaufort	„ ..	64	157	249	·7	11·8	19·5
Keiskama Hock	„ ..	None.	None.	231	None.	None.	33·5
King William's Town	„ ..	224	253	291	21·5	25·4	11·7
Fort Peddie	„ ..	43	Troops withdrwn.	..	5·5	..	..
Fort Napier	„ ..	..	96	51	..	7·1	9·2

MAURITIUS.

Improvements have been effected in regard to water supply and cooking means at posts where most required; the latter appliances had long been desired as a general measure in the Command.

It has been recommended by the Army Sanitary Committee that the regulated cubic space for troops in this climate should be 1,000 feet per man. The measure will involve a material amount of barrack extension and, as the present barracks and hospital of Port Louis, especially, are old and far behind the sanitary standard of the age, the question of new constructions has come under consideration. With this necessity a proposal to resort to a hill station for the troops has been made, a choice of two localities near the centre of the island being indicated; one of these called "Curé Pipe," having the greater elevation, and being the cooler, is thought by Dr. A. Gordon, C.B., to be the more eligible, with its further advantage of communication with the Midland Railway, which passes through the district and would afford ready means for the transit of troops to and from Port Louis as required.

The ratio of 11·1 per 1,000 for the year 1863, of mortality among the troops from all causes, is, in this climate, a very gratifying result of the sanitary care assiduously maintained for their welfare.

CEYLON.

As a Local Committee is to be assembled for the purpose of inquiring into the military expenditure of this colony, and whose investigation, it is hoped, may lead to many sanitary reforms and re-distribution of barrack accommodation with hospital improvements, it is thought unnecessary, on this meanwhile occasion, to enter upon detail of existing conditions bearing upon the hygienic interests of the troops. The general insanitary state of things, within the Fort of Colombo especially, has been oft repeated; the most unsatisfactory condition of its barracks and hospital, the faulty site, defective external ventilation, bad lighting, worse drainage, cesspit conservancy, inadequate lavatories and bath appliances, indifferent water supply, local malaria within the works, as well as in the vicinity.

The last three months of 1863 presented an unhealthiness, in regard to the Army Returns of Sick, which, however, was accounted for specially through the circumstance that the 2nd battalion of the 25th Regiment arrived in the Command, at the beginning of this, the unfavourable, season of the "longshore winds," and had to be encamped for a month until the barracks were vacated by the 50th, ordered on to New Zealand. The 25th were unacclimated young soldiers and, unfortunately, were unprovided with flannel under clothing and, through some contingency, supplied with defective boots, causes to which the medical officers attributed much of their suffering.

THE AUSTRALIAN COLONIES.

The principal medical officer of these colonies, Staff Surgeon-Major Dr. Sall, reports that the paucity of troops in the united Command, consequent on the necessary despatch of reinforcements to New Zealand for active service in the field, together with the very healthy state of the remaining troops, left but little scope for him to remark upon in sanitary respect. He took the opportunity, however, to repeat the suggestion he had made in his previous Annual Report as to draining the extensive swamp existing in close proximity to the barracks of Melbourne, and which involved a primary error in the selection for their site.

Floods appear to have been experienced this year at Melbourne, and the exceptionally heavy rains are reported to have left the extensive swamp in question in a condition which, under solar influence, might prove inimical as a source of disease. Diarrhœa, in fact, had been a result in many instances amongst occupants of the barracks in connection with this malarious source.

In regard to Sydney, the force had been reduced to 100 men, and 98 occupied Hobart Town, Tasmania.

NEW ZEALAND.

ON THE SANITARY CONDITION OF THE TROOPS SERVING IN NEW ZEALAND DURING 1863.

By Inspector-General MOUAT, C.B.

THE force employed in New Zealand during the year 1863 was composed as follows:—

Corps.	Stations occupied during 1863.	Yearly Average Strength in New Zealand of— Non-commissioned Officers and Men.	Officers.
Royal Artillery ..	Auckland, Taranaki, and in the Field	274	7
„ Engineers.. ..	Ditto, ditto	69	4
1st Battalion 12th Foot..	At Outposts, but chiefly in the Field	388	15
2nd „ 14th „	Head-quarters, at Outposts, and in the Field, and Detachments at Napier and Wellington ..	1,094	40
2nd „ 18th „ ..	Outposts and on Field Service ..	401	19
40th Foot	Queen's Redoubt and Field Service	677	27
43rd „	Otahuhu and Drury, with Outposts	54	8
50th „ ..	Otahuhu, Drury, and Raglan, and Outposts ..	132	6
57th „ ..	Taranaki and Outposts, and Field Service, with Detachment at Wanganui	906	37
65th „ ..	Otahuhu, Auckland, and Field Service	919	26
70th „ ..	Otahuhu, Taranaki, and Field Service	791	38
Various Staff corps	Auckland, and all over the country, and on Field Service	74	43
	Total	5,779	266

During seven months of the year now under review, the troops in the New Zealand Command have been employed in active field-service conducted against the insurgent Maories. The following observations apply only to the Imperial troops, the colonial forces are not alluded to.

During the year there has been an average strength of 5,779 non-commissioned officers and men in the Command, and the deaths from all causes have amounted to 124, or 21·457 per 1,000 men. Deducting men killed in battle (62), men who died from effects of wounds received in battle (11), men drowned (12), and men killed by accidents (3), it is found that 36 men have died during the year in the whole force from actual disease, or 6·22 per 1,000 men, which is an exceedingly favourable death-rate.

During the year, the following stations were occupied by the troops in New Zealand:—Auckland, Taranaki, Wanganui, Wellington, Napier, Otahuhu, Drury, Pokeno, and Dunedin; and in the active operations carried on, various points in the Waikato Valley have been garrisoned, or have been held for longer or shorter periods.

A comparison of the different rates of sickness and mortality at the different stations would simply mislead; the sickness originating at the station could not be distinguished from that originating elsewhere but treated there. It has been necessary to transfer the sick from one station to another, so that a large mortality at a place, as Pokeno or Auckland, is of itself no proof of the unhealthiness of those stations.

Auckland.—This has necessarily been the most important station in New Zealand; it has been the primary base of operations against the insurgents, and the place at which the troops coming from England and from India and elsewhere have disembarked, and here a General Hospital has been established. In times of peace a small force only was kept at Auckland, and the various military establishments were calculated for the use of one small regiment only. During the year 1863, it was necessary to supplement the barrack accommodation, which was done partly by the erection of wooden huts, but chiefly by the encampment of the troops pitched in the barrack square.

It is to be regretted that, concomitantly with this makeshift accommodation, a proportional increase was not made to the ablution, latrine, and urinal provision. This has remained without proportionate increase. A certain portion of the permanent barrack-buildings has, during the year, been made over for use as an hospital. This was the best arrangement that could be made, having in view the exceptional character of the circumstances which caused the authorities very legitimately to object to spend money in erecting a proper hospital, but it is needless to say that the auxiliary accommodation thus gained, being as it was, without the requisite outbuildings which ought to belong to an hospital, was at best very far from perfect.

The town of Auckland (in which the barrack is situated) is one of the most insalubrious anywhere in New Zealand; and though the effects of this state have chiefly fallen on the children of the soldiers, rather than on the men themselves, it has not been without a certain appreciable influence even on them.

Taranaki.—In the province of Taranaki active field operations have been conducted during eight months of the year, and various field-posts have been occupied from time to time; but a considerable part of the troops in this province have been quartered in the town of New Plymouth. The men are accommodated in (1) huts constructed of corrugated iron, (2) in wooden huts, and (3) in rooms in the block of houses erected for the defence of the town. In the first and last-named buildings the space and ventilation has been good. In the wooden huts neither the amount of space nor the ventilation was sufficient. The inconvenience caused by want of means of ventilation has been counteracted by the warping of the boards of which the huts are composed, and thus air has been admitted, though at some expense to the comfort of the men in other ways.

The means of cooking at the New Plymouth Barracks are deficient. The ablution accommodation is insufficient, and the warming of the barrack-rooms has not been attempted. A serious discomfort is thus entailed on the men in the cold, raw, wet days of winter.

The hospital accommodation at New Plymouth has been fairly good, not up to the regulation standard in point of space, but this has been met, when requisite, by supplementing the accommodation by marquees boarded. The warming of the hospital is not complete, and a dead-house requires to be erected.

Wanganui.—Another permanent post in the province of Wellington has been occupied during the year by an average strength of 353 men, who have been accommodated in permanent buildings, block-houses erected at points suitable for defence, and certain hired buildings. The men have been overcrowded in barracks, but it is not apparent that any illness has arisen from this cause.

The means of cooking at this station are defective.

The hospital accommodation at this station is not up to the regulation standard in point of cubic space, each man is provided with only 787 cubic feet of air; but otherwise, for a small and temporary hospital, the accommodation is not to be complained of.

Wellington.—At this station during the year there has been an average strength of 275 men, who have been lodged in permanent barracks, consisting of wooden huts erected on the eminence called Mount Cooke, in two blocks, one higher up the hill than the other. The huts have afforded accommodation, with 366 cubic feet of air to each man.

At this Station cooking-ovens have been erected, but their imperfect construction has neutralised their use, so that the men are reduced to use the boilers alone for cooking.

The hospital accommodation has been sufficient for the small number of patients requiring treatment, and has given an average of 1,400 cubic feet of air to each patient.

Napier.—This station is situated in the province of Hawkes Bay, on the east coast of the north island of New Zealand. There are here permanent barracks, which are built on a hill, 250 feet above the level of the sea, and much exposed from the want of shelter to the frequent gales prevalent. The men reside in wooden huts, arranged so as with other buildings, to form part of an oblong square. The cubic space afforded to each man during the year has been 291 feet. Since last year improvements have been made in the ventilation of the barrack-rooms.

There is no ablution-room attached to the barracks, but tents are allowed instead. For cooking meat otherwise than by boiling there is no arrangement. The quarters for married people are exceedingly objectionable.

The hospital at Napier forms a part of the oblong square of the barrack-buildings occupying one end of the square. The accommodation for patients during the year (daily average of five) would, had it been all used, have given 1,826 cubic feet of air to each patient. The hospital wards are neither properly lined nor ceiled, and are therefore, in windy weather, uncomfortable.

Otahuhu.—This station is in the province of Auckland, and lies about nine miles nearly south of the town of Auckland. At Otahuhu a standing camp has been formed, on a site combining the requisites of convenience and of healthiness, and having an abundant supply of excellent water. The men in the camp have mostly been lodged in wooden huts. In times of unusual pressure the accommodation has been increased by tents. The camp is meant to accommodate in huts, 2,448 men; and, at this rate, would not give more than 187 cubic feet of air to each man. No provision has been made for warming the huts, and not sufficient for ventilating them. These huts were erected under a great pressure, and were objected to by the Senior Medical Officer at the time; but the objection was overruled, as the object was stated to be only a temporary substitute for tents.

The outbuildings are all on a limited scale, corresponding to the intermediary character of the station, half camp, half-barrack.

At Otahuhu, when the war broke out, it was requisite to establish a General Hospital in which the different regiments might leave their sick on marching to the front. For this purpose, one hut specially designed for hospital purposes was occupied, and three barrack-huts were also taken. Kitchens and the necessary store-rooms were extemporized. The accommodation for patients amounted to fifty-two beds, and the cubic space to each man, when the hospital was full, would have amounted to 358 cubic feet, but marquees were from time to time used to take off the pressure on the ward-space.

Drury.—At this post a standing camp had been formed, and a small field-hospital was formed to receive the sick in camp, and such cases of illness as could not be properly treated at the small outposts in the neighbourhood. Wounded men who had suffered in various skirmishes were also received here, so long as the scene of operations was in the vicinity. The hospital accommodation consisted of two huts, and the cubic space allowed in them to each patient was about 230 feet; subsequently, bell-tents and marquees were pitched. No proper outbuildings had been provided, but bell-tents and raupo huts were used.

In the district of Drury there were many small posts garrisoned for the protection of the country, (1) Upper Wairoa, (2) Lower Wairoa, (3) Galloway Redoubt, (4) Kerikeri, (5) Papakura, (6) Shepherd's Bush, (7) Martyn's Farm, (8) Williamson's Clearing. The posts here consisted of small stockaded redoubts, within which the troops comprising the garrisons lived in huts. The sites were selected solely with reference to military objects, and the question of defensibility overbore all sanitary considerations. In some of the redoubts, huts, after the native fashion (called whares) were constructed by the men, but this was by no means a general custom. The sick from the various redoubts were, if slightly ill, treated in their quarters, and if seriously ill, were sent on to Drury.

Pokeno.—The post at Queen's Redoubt was the station of the Pokeno Valley. This important point formed, at the beginning of the present war, our most advanced post, being within less than two miles from the Waikato River. Queen's Redoubt constituted a base from which offensive operations were initiated. It contained magazines and stores of every kind, and was held by a garrison of varying strength, whose duties were to guard the neighbourhood, and to furnish daily escorts to the provision-carts traversing the Great South Road. The garrison was partly accommodated in wooden huts, and partly in tents. The accommodation, considered as that of a permanent station, was very insufficient. The redoubt was not sufficiently spacious for the size of the garrison and the expansion to which the establishments had attained, and the necessary hygienic precautions, owing to the perpetual stream of men arriving and departing, could not be systematically carried out. In spite of these circumstances the station, during the year 1863, was an exceedingly healthy one.

At Queen's Redoubt the General Field Hospital was established, and here at first the wounded were brought direct from the field of battle; those from Paparoa, Tuakua, Koheroa, and Rangariri were treated here. The sick from regiments in its neighbourhood were also drafted into it, and it likewise served as an hospital for the garrison.

The hospital accommodation at Queen's Redoubt consisted of one wooden hut, specially designed as an hospital, having a cubic capacity of 9,480 feet; also of the common barrack huts having together a cubic capacity of 13,322 feet. The rest of the sick were accommodated in marquees. The rule observed in the apportioning of space in the hospital was to give most air to wounded men having suppurative discharge, and to men suffering from illnesses which might become infectious by vitiation of the air around them; but it may be said generally that in the hospital hut 677 cubic feet of air were allowed to each patient, in the barrack huts 660 cubic feet, and in the marquees 598 cubic feet.

The General Field Hospital at Queen's Redoubt turned out to be most remarkably healthy, and it is remarked in the report furnished by the Medical Officer in charge of it, at the end of the year, that at no time was there anything of an hospital atmosphere about it; the most extensive wounds healed rapidly, and there were none of those fortuitous complications, such as pyœmia, hospital gangrene, and the like, which are due usually to hospital influences.

Included in the Pokeno Stations were the following: 1, Razor-back; 2, Rhodes Clearing; 3, Paparata; 4, The Thames District; 5, Tuakau; 6, Koheroa; 7, Meremere. The troops occupying these posts were encamped inside the redoubts erected for their protection.

Dunedin.—This has been the only military station occupied in the Middle Island of New Zealand during the year. The station was originally erected for the necessities of the Otago colony, after the discovery of gold in the province; but the urgent necessity for troops in the Northern Island occasioned the withdrawal of the small body of the 70th Regiment forming the garrison. During the occupancy the men were lodged in comfortable wooden huts, and the sickness was trifling. The fragment of a very good annual report has been received from the Medical Officer in charge, but unfortunately, no medical particulars are given, though an interesting general account of the town of Dunedin.

Duties.—The duties of that portion of the troops quartered in barracks and in stationary camps, or fortified posts, has consisted in the performance of the usual guards, and in furnishing patrols for the protection of the vicinity, and escorts from one post to another. The frequency with which guards and other duties has occurred has been very various, and no distinct idea can be formed from a perusal and collation of the regimental reports how far and in what way the health of the men has been injuriously affected by these duties.

The ration for the troops in garrison has consisted of the usual pound of meat, and 1¼ lb. of bread. Tea ⅙ oz., coffee ⅓ oz., sugar 2 oz., salt ½ oz., pepper 1/36 oz. daily; potatoes and other vegetables were procured by regimental arrangements. The ration stoppage was 3½*d*.

The rations for troops in the field was different. The excessive fatigue undergone by the men actually doing duty in the field, and the impossibility of procuring vegetables, made it necessary to nourish them well, in order to keep them efficient for their work. The subject was brought by me before the Lieutenant-General Commanding, and a Board of Officers was ordered to investigate and to report on it. In consequence of the recommendation of this board, the ration for troops in the field was ordered to consist of the following articles:—Fresh meat 1 lb., or salt meat 1 lb.; bread 1¼ lb., or biscuit 1 lb.; potatoes 1 lb., or in lieu, preserved potatoes 4 oz.; or preserved vegetables 1 oz., or peas ⅓ pint. With fresh meat, onions ¼ oz. were issued, or mustard 1/16 oz., or pickles, 1/12 oz. Tea ⅙ oz., coffee ⅓ oz., rum 1 gill, sugar 2 oz., pepper 1/36 oz., salt ½ oz., with candles and firewood.

It cannot be doubted that one efficient cause of the very high standard of health presented by the troops in the field has been due to the good dieting. It must always be borne in mind that however large a ration may seem on paper, that when the food is really issued a very considerable reduction must be made from it for waste in the issue, and other causes.

The quality of the articles composing the ration has been various; but, considering the difficulty of feeding an army in the wilderness, the troops have not been badly treated in regard to quality.

The cooking has been generally defective. The men seem to be satisfied with the boiling and grilling of their meat, and reform in this matter, unless it commences with an alteration in their tastes, would seem to be almost impracticable.

Intemperance.—The troops in quarters have furnished the largest relative proportion of cases of illness due to intemperance; the troops employed in the field were for the most part debarred from intemperance by the high price charged for rum by those who illegally trafficked in it. Taking the whole force, the number of cases of ebriositas and of delirium tremens has amounted to 81, and one death has occurred. The percentage of admissions from intemperance of all diseases treated would be 2·46, but it is quite impossible to state in how many cases drunkenness has been the immediate cause of other admissions, such as accidents, diarrhœa, dyspepsia, and so on. Perhaps I should not over estimate the number by placing one half of all admissions whatever as having been immediately or remotely due to intemperance.

Clothing.—Besides the ordinary regulation of a kit of a soldier the men in this Command have been clothed in a dress of blue serge, consisting of trowsers and a loose smock or shirt, called in colonial phrase, a "jumper." In conception this is an excellent dress, and it is specially adapted to marching in a country in which there is commonly a warm sun and a cold wind, and where consequently the men have been exposed while perspiring to the chilling draughts of wind coming down narrow gullies, or met with on the exposed heights of hill ranges. The improvements necessary to make a better dress would be, providing better serge with less cotton in it, so as to be warmer and not to shrink so much after rain, and a little more looseness in the fit of the clothes.

Waterproof coats were provided for a certain proportion of men in the field to be issued on guards and pickets, and they added much to the comfort of the men, and doubtless also to their healthiness.

Amongst other improvements, it would be well if the leather gaiters now used by the men when marching were made larger, so as to reach the knee, but not to cover it, and it is proposed by the Surgeon of the 65th Regiment that all ammunition boots issued to the men on a campaign should have the hob-nails driven in before issue, so as to be ready for wear. The difficulty of ascending heights made perfectly greasy by rain without hob-nails in the soles is very great, and adds notably to the pull on the strength of the soldier. The admissions into hospital due to footsore are returned as only 25 per cent. of all the admissions; but this very greatly underrates the ineffectiveness caused by badly fitting boots; few cases of trifling illness by blistered feet would appear amongst admissions into hospital, whilst severer cases would appear not under the head of vesiculæ pedis, but as ulcus or abcessus, whilst subluxatio would also furnish a quota made ineffective by marching in badly-fitting boots.

Much improvement requires to be made in the blankets supplied to the men. The present grey regulation blanket seems to have very little wool in it, its chief component is hair, either goat's or dog's, and as a consequence, there is no sufficient warmth in it, and it is weighty quite out of proportion. It further absorbs rain or dew like a sponge, and loads the unfortunate bearer like a pack horse in wet whether. A perfect campaigning blanket ought to be light, and might have one side waterproofed. Such things are to be purchased in this country at moderate prices. They are used by people having occasion to camp out in the bush.

The compulsory wearing of flannel shirts would seem to be a required improvement.

CHINA.

REPORT ON THE SANITARY CONDITION OF SHANGHAI, AND ON THE EPIDEMIC OF CHOLERA, WHICH VISITED THAT STATION IN 1863.

By Deputy Inspector-General HOME, M.D.

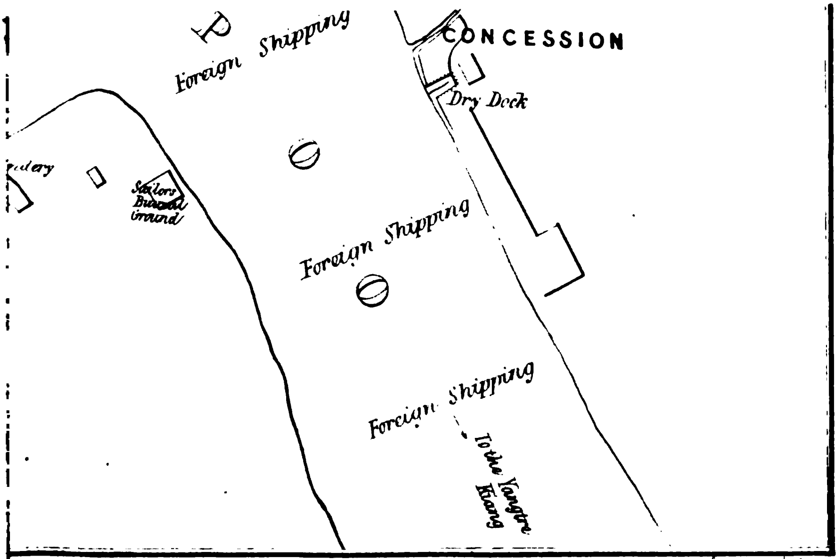
SHANGHAI, already by far the most extensive and busy of all the ports in China open to foreign trade, both from its position and marvellously rapid growth, promises to dispute ere long with Calcutta itself the pre-eminence of being the largest and most important commercial city of the East.

Its foreign connection, which scarcely dates back as far as 20 years, was commenced by a few of the large mercantile establishments in China, erecting houses on the bank of the Wong-poo River, nearly three miles below the Chinese city of Shanghai, at the point where that river is joined by the Soo-Chow Creek. From this small beginning has arisen what is now called the Foreign Settlement, which has recently acquired so great extension as nearly to cover the three miles of intervening space, and already to reach almost to the walls of the ancient city, which it likewise all but rivals in the number of its inhabitants.

The great cause of this vast increase in the settlement of late years was the opening of the Yang-tze-Kiang River to foreign trade in 1860.

From the immense valley drained by this, the largest of all the Chinese rivers, nearly the whole of the products sought for by Europeans in China are obtained. The great silk and tea districts lie along its banks, and though the cultivation of both has been materially interfered with by the Taiping Rebellion, still even this has served to advance foreign interests in China by throwing the whole carrying trade of this vast river, whether of native or foreign merchandize, for security's sake, entirely into European hands.

Shanghai is not situated on the Yang-tze-Kiang itself, but 18 miles up a navigable tributary called the Wong-poo or Woosung River, the latter name derived from that of a small town at the place of its junction with the parent stream. This tributary, not less than a mile in width opposite Shanghai, affords good and safe anchorage for the many vessels which visit the port;



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and while it is interesting to witness the bustle and activity which everywhere pervades the foreign shipping, of which as many as 280 vessels are not unfrequently in port at once, it is curious to contrast the interminable rows of native junks, which, driven off the Yang-tze-Kiang by foreign enterprise, are now, to the number, it is said, of several thousands, while rotting at their moorings, used only for dwellings by the large water population of the neighbourhood.

The native city of Shanghai is a large and populous town, surrounded by lofty embrasured and loop-holed walls, outside of which is a wet moat, communicating freely with the many creeks and canals with which the whole country is covered, as with an intricate network.

These creeks, which are of every degree of magnitude from that of wet ditches upwards, exist both within and without the city, and serve not only as highways of communication in a country where roads are few, but being composed of fresh and very filthy water, rising and falling with the tide, are used also to irrigate and fertilize the soil, and likewise as receptacles for all sorts of refuse of both a vegetable and animal kind, not considered otherwise suitable for the purpose of manure.

A large surface of mud, highly impregnated with organic matter, is thus at low water necessarily exposed by the receding tide on the banks of these canals and creeks, which, when acted on by a powerful summer sun, gives off exhalations not only powerfully offensive, but highly injurious also to human health.

Besides the many wet-ditches traversing the city in all directions, and which are little better than so many impure, uncovered drains and cesspools, there is a considerable amount of waste and marshy ground within the walls. Heaps of decomposing refuse and manure are accumulated in every available vacant space, the streets are narrow, tortuous, and difficult of ventilation, human excrement is deposited with little disregard of decency in all directions, and every here and there large earthenware receptacles containing putrid urine (intended eventually to be scattered over the crops) solicit contributions from the passers by. Though Shanghai, in these respects, be not worse perhaps than other Chinese towns, it may be affirmed that no such utter disregard of sanitary rules and regulations as exists here is anywhere to be found in Europe.

The Foreign Settlement, which originally commenced at three miles distance from the native city, has, by its rapid growth, all but united and become one with it. Although subjected to considerable sanitary difficulties by the innumerable native population that have established themselves within its precincts, it is still, as regards arrangements for health, infinitely superior to its more ancient neighbour. Here are no open creeks or ditches, no dirt-heaps or deposits of manure or other filth, the streets, which intersect one another at right angles, are straight, wide, and airy, they are regularly swept, watered in summer, lighted by night, and a system of efficient drainage has recently been undertaken.

The confusion consequent on new buildings being run up in all directions, and the evils of over-crowding, cannot easily be got rid of in a large settlement where the accommodation, however rapidly on the increase, has always fallen far below an adequate supply.

Within the Foreign Settlement the Royal Artillery and Engineers are quartered, and all the military offices and stores exist.

Inside the native city, three miles distant, and in a Chinese Temple (Confucian) the 67th Regiment are stationed, and in the intermediate space outside the city walls, and on the outskirts of the settlement, are the buildings occupied as barracks by both the left wing 22nd and whole of the 29th Bombay Native Infantry.

The general features of the country around Shanghai are those of a flat, alluvial plain, without elevation of any kind, or even trees or hedges, to add variety to the scene. The landscape is, therefore, uninteresting and monotonous in the extreme, and for miles in the interior the ground does not rise more than a few feet above the level of the river. The soil is a rich loam, and all kinds of cereals grow most luxuriantly, as well as cotton and garden produce, the vegetables being specially luxuriant from being regularly watered with animal manure (chiefly putrid urine) in a liquid state.

But of all the mal-sanitary arrangements in existence here, by far the most noxious and disgusting is the ordinary practice of placing coffins containing the dead on the surface of, instead of beneath, the soil, in gardens, fields, commons, or along the side of the roads.

The most shocking and loathsome stenches in consequence assail the nose in all directions. Winds blowing from every quarter are laden with these impurities, and so universal is the habit of thus disposing of their dead, that scarcely does any vacant space exist either within or without the city walls that is not more or less appropriated to this disgusting practice.

In the immediate neighbourhood of the Confucian Temple coffins so exposed existed when our troops first took up their residence there, to the amount of hundreds. These, however, have gradually been got rid of since, and now but few remain, only such as being of an ancient date, have long ceased to emit any fœtid odours.

From the vicinity of the Foreign Settlement the encroachment of this most noxious evil has been carefully excluded, and no such unseemly objects as exposed coffins meet the eye.

The temperature of Shanghai, as may easily be conceived in a climate where the summer heat often reaches 100° in the shade, and the thermometer in winter falls as low as 24°, is subject to excessive and sudden variations, which cannot but exert a most important influence on the human health. During three months of the year—June, July, and August—the temperature is intensely tropical, the mean of these being 82° and 83°. The weather is then sultry and still, the atmosphere charged with electricity, clouds cover the sky, and the feelings are those of indescribable exhaustion and oppression. Sunstrokes are then common, or rather, as it should be called, heat apoplexy, the attacks taking place as often in dull weather as in sunshine, and almost as frequently at night as in the day.

During December, January, and February, the mean thermometric range is from 37° to 39°, bitter northerly winds blowing with remarkable intensity, and snow-storms to a moderate extent not uncommonly occurring.

A marked feature of the climate is the extreme dampness of the air, the atmosphere for the most part throughout summer, and frequently in winter, attaining very nearly the point of complete saturation with watery vapour. This, likewise, cannot but exercise a powerful influence on health. Rain, which in amount is not excessive, falls at all seasons, but more especially during summer and autumn, the most rainy months last year being June, September, and December, and in these successively then falling 13, 11, and 18 inches respectively.

Another important circumstance as regards the health of the community is the water supply, which is here derived from two sources, the river and wells. In the Foreign Settlement it is obtained nearly wholly from the former of these, and in the Native City almost as completely from the latter.

The well water is tainted in a greater or less degree with the organic impurities of the soil through which it percolates, and is here nowhere pure, and though the river water is in some respects preferable, it also is contaminated with the filth of the many creeks which the receding tide aids in mixing with it. Dead bodies also, of late years, are constantly to be seen floating about in the river, which, likewise, must materially assist in impairing its purity, nor is the water ever clear, but this is easily obviated, either by means of alum or by a means of wholsale filtration, which has lately been set going as a private speculation; on the whole the river water is considered as decidedly the most wholesome, and when both can be obtained is invariably preferred.

Having made these preliminary remarks on the topography and general sanitary condition of Shanghai, under which name is included both the native city and foreign settlement, it may be interesting before specially noticing the epidemic of cholera, which prevailed among the troops there in 1863, to premise a short account of the same disease as it has in former years appeared among the troops in China, and also to consider in greater detail the first and more formidable epidemic that fell upon Shanghai, that namely of 1862.

After a careful perusal of the returns and reports contained in the Principal Medical Officer's office here for the last ten years, I find that previous to the year 1838 cholera was almost unknown in China. Individual cases bearing the name, it is true, now and then occurred, but these were rarely fatal, and manifested themselves only at distant intervals.

In 1838, with a view of engaging in hostile operations against the Chinese, a large body of native troops were brought from India, and though in the Medical Reports of that date little notice is taken of cholera, either having accompanied them on the voyage or specially affected them after arriving here, still the fact is a significant one, that not only did that year show a very marked increase in the number of cholera cases for China, more than half of which were fatal, but the disease has, no single year since, been absent from the medical returns of the Command.

It is likewise remarkable that the Indian troops while serving here have ever since its appearance in 1838 shown a decidedly less liability to this disease than Europeans have, and as will by-and-by be seen from the results of the two epidemics at Shanghai, they even when attacked recover in considerably larger proportion than Europeans do. The following is a list of the total admissions and deaths in the European force serving in China during the last six years:—

Years.	Strength.	Admissions.	Deaths.	Percentage of Deaths to Attacks.
1858	1665	42	22	52·3
1859	1479	4	2	50·0
1860	8802	55	37	67·2
1861	6135	11	7	63·6
1862	3511	171	109	63·7
1863	2946	64	40	62·5

In the native troops serving in China during the same years, and of which the strength has never fallen below 2,000, the mortality has been been successively 1858 ·3, 1859 ·0, 1860 ·43, 1861 ·1, 1862 ·15, 1863 ·10.

The comparatively large number of both classes who suffered in the year 1860 being due to the great increase in the force which was then serving in China during the hostile operations in the north, the taking of the Taku Forts, and the advance on Peking.

No account can be obtained of the disease having ever extended to the civil population until 1862.

In the spring of that year the Taepings, who were in possession of the silk districts around Shanghai, made a demonstration threatening an advance upon that city; they laid waste the surrounding country, occupying all the towns of any size, burning the villages and driving all the rural population who escaped destruction to seek shelter within the walls of Shanghai, or the limits of the Foreign Settlement.

These wretched creatures, homeless, starving, and destitute, poured in myriads into a city already overcrowded with its own population, multitudes of them lay down and died in the streets, and the remainder, for whom barely sufficient food could be provided to keep them from starvation, were thus, as it were, a soil peculiarly fitted for the germination and development of epidemic disease.

For the protection of Shanghai and with the view of clearing a radius of thirty miles around of these devastating rebel hordes, and so permitting such of the refugees as survived to return to their homes, the brigade of the Army which had wintered at Tien-tsin, and had enjoyed admirable health in the north, was in the end of April (1862) brought down to Shanghai and immediately entered on field operations there. The marshy nature of the district in which these were conducted; the continued exposure to the sun which, in May, had begun to acquire an unpleasant power; the passing of the night on board canal boats, and in other low situations, often without covering from the dews; the use of salt provisions and the drinking of bad water all tended to lower the standard of health among the troops, and to render them, afterwards, more readily the victims of disease.

Scarcely had these field operations continued for a month when cholera suddenly broke out among the men, the first case occurring, about the 20th May, in the French contingent, forming part of the same expedition, and on the 22nd, extending to the English troops. Of the latter it had by the end of the month (10 days) carried off no less than 28 Europeans and 5 natives.

The expedition now returned to Shanghai, where, among the overcrowded and destitute population, both of the Native City and Foreign Settlement, and also the shipping in the harbour, cholera had already broken out.

Among the Chinese its progress was fearfully rapid, and the mortality enormous, one-eighth of the whole population having, it is stated, been carried off in the four months during which its ravages continued. The foreigners in the settlement, of whom a very large proportion are a wild, lawless, and dissipated class, suffered also severely: their number, which was, in 1862, computed at a little above 8,000 lost no less than 1,600 within the year, chiefly from cholera, the victims being derived almost entirely from the class above described.

The garrison too, for whom suitable accommodation could not at once be procured, were also severe sufferers, the disease prevailing among them from the 22nd May to the 19th November, and carrying off 93 European and 15 native soldiers out of a strength of 1,927 and 1,040 respectively. Of the British force 65 per cent, of those attacked died, while of the natives little over half that number (or 37 per cent.) fell victims to the disease. The months in the order of fatality being June, May, August, July, September, November, and October. Of the officers and civilians of the better class it is important to remark scarcely one suffered from the complaint, showing of what consequence, even during the prevalence of a powerful and virulent epidemic influence, are the sanitary advantages of spacious and airy dwellings, good and nutritious diet, regular exercise, and the enjoyment of comfortable circumstances.

It is universally believed throughout China that the epidemic took its rise at Shanghai as a direct consequence of the Taeping rebellion. Without, however, connecting the latter with the disease further than as regards the misery and destitution which it occasioned, this much is certain, that here (Shanghai) cholera first made its formidable outbreak, spreading speedily northwards along the chief lines of communication, the sea coast, and Grand Canal, visiting, successively, each large city in its course, arriving at Taku in the middle of June, at Tien-tsin towards the end of that month, and at Peking at a later date. From this it is known to have advanced still northwards into Mauchuna, but there all traces of it are lost.

In a southerly direction, strange to say, it has shown little tendency towards extension, none of the ports in almost daily communication with Shanghai having, so far as I am aware, suffered from the epidemic influence. At Hong-Kong, even during the same period, there occurred but a few sporadic cases.

The summer of 1863 found the troops in Shanghai much more favourably circumstanced, as regards their sanitary condition, than they had been the year before. Their quarters, though by no means all that could be desired, had been put in good repair, a thorough cleansing had taken place both within and without, surface drainage had been attended to, the necessary outhouses had been erected, and a system of order and regularity introduced, which, in consequence of the recent arrival of troops from the north, and the field operations undertaken immediately after, it had been the previous year altogether impossible to effect. The rations also of the men had since then been considerably improved, fresh provisions being issued five times a week and soft bread daily.

At the time now under consideration (the summer of 1863), the 67th Regiment, 457 strong, was wholly quartered within the native city of Shanghai. The head-quarters, 271 in strength, occupied the Confucian Temple, a spacious building composed of large and lofty ground-floor apartments, but closely encompassed by wet ditches, filled with the most foul, unwholesome water, kept in a constant state of agitation by the rising and falling tide. The margin of these creeks, and much of the open space around, was covered with luxuriant vegetation and gardens producing vegetables, watered daily with decomposed urine and liquid manure of the most offensive description. The coffins, which had a year before in such numbers occupied this vacant space, had been in a great measure removed elsewhere, though enough still were left at distances more remote, with the wind in certain directions, to taint the air with the sickening odours, at once recognised as proceeding from the decomposing dead. The four minor barracks in which as many (four) companies of the regiment were quartered, consisted of smaller temples, likewise within the city walls, and all in consequence exposed to the same evils of stagnant water and impure and muddy ditches as the head-quarters were, with the additional disadvantage of being closely surrounded by native houses.

The Royal Artillery and Engineer barracks consisted of two merchant stores, situated in a principal street, in the centre of the Foreign Settlement, nearly three miles distant from the quarters of the 67th Regiment, and far better circumstanced than them in a sanitary point of view. These buildings were of two stories high, some of the men occupying the ground, others the upper floor. Drainage had in neither of these houses received the attention it deserved, and being closely surrounded by other buildings, had there been any choice, they would not have been selected as very desirable for military occupation.

These, however, have since been given up, and the Artillery and Engineers now occupy the large and commodious Godowns on the Soochow Creek, originally taken for the 31st Regiment.

The Ningpo Joss House is a temple formerly used as a place of temporary deposit of the dead of that portion of the native community belonging to the city and district of Ningpo. Standing alone and apart from other buildings, in a somewhat elevated position outside, but closely adjoining the city walls, and possessing ample accommodation for 450 men in its large ground-floor apartments, it was at an early period (1860) selected as a fitting barrack for the head-quarters of an Indian regiment. The remainder of the Bombay Native Infantry, about 250 in number, occupied a large building within the city walls, called "Mandarin House," about half-a-mile distant from the Ningpo Joss Barrack. Both these stations were in close proximity with the foul tidal creeks so common in every direction here, and the larger of the two, the Ningpo Joss House, was in addition peculiarly exposed to the stenches and effluvia of coffins, which every here and there dotted the open plain stretching for some distance to the north and west of it.

Previous to the outbreak of the cholera in 1863, this plain had undergone a process of levelling with the view of its being disposed of in building lots, so that not only was there a considerable exposure of recently disturbed earth (considered always to be unwholesome in China), but also in carrying out these procedings many graves had been disturbed in different sections of the ground, which had hence evidently been used as a place of sepulture.

These barracks, called "Glasse's Post," also consist of a Joss House, situated at nearly an equal distance between the Chinese City and the Foreign Settlement. They are partially surrounded by native dwellings, and are not more exempt from marshy exhalations (though a little less so from the effluvia proceeding from tidal creeks and ditches) than either the Confucian Temple or the Ningpo Joss House.

The men were quartered in two spacious rooms on the ground-floor, which, however undesirable for Europeans in this country, experience shows to be by no means objectionable for natives, and though, in regard to food, lodging, clothing, &c., they were in no degree better off than the 29th Bengal Native Infantry, still not a single death from cholera occurred among them, and only two slight cases are mentioned as having shown themselves.

Having premised this short sketch of the quarters in which the cholera visitation of 1863 found the troops at Shanghai accommodated, I shall now proceed to give a few details of the epidemic itself.

Being on my inspection tour at Shanghai late in the spring and beginning of the summer of that year, I had taken every means of assuring myself that the troops there were as well conditioned in a sanitary point of view, as circumstances would admit.

The middle of June having arrived without any threatening of cholera having manifested itself, though more than three weeks after the time of its commencement the previous year, I entertained a sanguine hope that the station was this year to enjoy an immunity from any epidemic attack. Immediately after my departure (15th June), the weather suddenly became intensely hot, the thermometer reaching 94 and 95 in the shade, and a few fatal cases of sun-stroke in consequence occurred among the troops.

In the beginning of July the first instance of cholera (which had for a week or more declared itself among the shipping) made its appearance in a soldier of the 31st Regiment, which was then in the act of embarking for England. About the same time also, 2 men of the Royal Engineers fell victims to the disease. In the following week 2 more of the 31st, 2 of the Artillery, 1 Engineer, and 4 of the 67th, together with 1 Native (29th Bombay Native Infantry) were carried off by it. The third week of July, 6 of the Artillery, 4 of the 67th, and 6 Natives (all 29th) were its victims, thus amounting to 16 in 7 days, the largest number that during any one week on this occasion died of the epidemic. On the following, the fourth week, there were 3 casualties only from the same cause furnished by the Artillery, the 67th and the 29th Native Regiment. On the 5th week also 3, viz., 2 of the 67th and 1 Native, and during the whole of August, the only other month in which the disease continued to show itself, but 8 men died (all of them belonging to the 67th Regiment), thus making the whole casualties of the epidemic, 9 Artillery, 3 Engineers, 3 of the 31st, 20 of the 67th, and 9 Natives belonging to the 29th Regiment, in all 44 deaths; as compared with 108 who had perished from the same cause the preceding year.

The limits of its duration had been, in 1862, from May to November, while this year they embraced but July and August. In 1862 the greatest mortality was in June, this year in July, but on both occasions, within a month of its commencement, the main strength of the epidemic had evidently exhausted itself. In 1863, out of a strength at Shanghai of 718 Europeans, 58 were attacked and 35 died; while of the native force, 886 strong, 55 were attacked and 9 died, being of the former 8 per cent. of seizures and 5 per cent. of deaths, and of the latter 6 per cent. attacked and only 1 per cent. of deaths.

It thus appears that the invasion of cholera in 1863 was chiefly characterized by the shortness of its duration—8 weeks—while that of 1862 lasted nearly as many months. During its continuance, however, it does not seem to have been milder at one time than another, the same number (35) having died in July, 1863, as were carried off in June 1862, and the former, too, out of a smaller force of Europeans.

Its malignity appears to have been pretty much alike both years, as, of the Europeans attacked, 60 per cent. died in 1863, and of natives 26 per cent., against 65 and 37, as already mentioned, in regard to the epidemic of 1862. In both instances the natives of India suffered much less from the disease than Europeans, and even when attacked had twice the chance of recovery that their less fortunate fellow-soldiers had.

I do not conceive that the object of such a report as this requires any notice being taken either of the symptoms of the disease or the remedies that were employed. Suffice it to say that in regard to the former they were very much what have been usually observed elsewhere, and as regards the latter that the results were in the highest degree unsatisfactory.

One fact of a sanitary nature I would, however, fain notice, which may not prove uninteresting even to a non-professional reader.

Much has been said in this report of the disregard of drainage, cleanliness, and ventilation, of the accumulated filth, the stagnant pools of foul water, and the coffins, exhaling pestilential odours everywhere, met with in and about the city of Shanghai. And when, after an epidemic has passed over such a locality, we find the same town as crowded to all appearance with human beings as before, one is disposed to ask if nature's sanitary laws are here the same as elsewhere, and to wonder if the violation of these laws in China is visited with similar penalties as overwhelming experience shows it to be in Europe.

That Europeans at least enjoy no immunity from the consequences of this neglect appears clearly proved by the following circumstances:—

The head-quarters of the 67th Regiment, it has been stated, occupied the Confucian Temple in the city, which, though surrounded by many causes fertile in the nurture if not in the production of epidemic disease, were nevertheless better off as regards space, ventilation, size of apartments, and freedom from close contact with natives than the other 200 men of the regiment, who were quartered in four detached houses or small temples in the centre of the most crowded portion of the town. The result was that while from all causes during the first month of cholera (July) the head-quarters had 21 per cent. of admissions and 2 per cent. of deaths, the four detached companies at the minor stations had 40 per cent. of admissions and 5 per cent. of deaths.

A still more remarkable proof of the influence of locality on the production of disease was in the instance of No. 3 Company, occupying one of those outlying stations called the "Crane Joss House," and where the sanitary defects of lowness and dampness of situation, stagnant water, and rank vegetation, with a surrounding high wall impeding ventilation, existed in a preeminent degree. This single company during the month of July, 1863, had no less than 46 per cent. of its strength admitted (from all causes) into hospital, of which it lost as many as 13 per cent. by death.

The surgeon of the regiment most properly recommended its being removed to airy and better quarters in the Foreign Settlement, and in the following month (August) there was admitted but 12 per cent. of its strength, yielding only 2 per cent. of deaths.

It will perhaps be of advantage, ere bringing this report to a conclusion, to offer such suggestions as my acquaintance with the locality, and knowledge of disease as it occurs in Shanghai, would lead me to propose with the view of protecting the health of the troops that may henceforth be quartered there.

1st. I would above all recommend, considering the many local disadvantages of Shanghai, and the utter hopelessness in connection with the habits of the people, of ever rendering its sanitary condition what, to insure its being a healthy military station, it ought to be, that the European portion of the garrison should be reduced as low as possible, and the protecting force be made to consist as far as practicable of Indian troops.

2nd. That somewhere between the Ning-po Joss House and Old Racecourse, which I believe to be the most elevated locality in the neighbourhood of Shanghai, good and substantial barracks be built for Europeans, either for a battery of artillery or regiment of the line, or both, as the defence requirements of the settlement may be considered to render necessary.

3rd. That additions be made to the present head-quarter barrack of the 29th Native Infantry, the Ning-po Joss House, to admit of its accommodating comfortably a whole native regiment of 1,000 strong.

4th. That in the European barracks none of the men be permitted to sleep on the ground-floor, and that the buildings be provided with ample verandahs and covered ways to afford protection from the sun.

5th. That cricket-ground, ball-court, skittle-alley, gymnasium, reading-room and library be added, as pre-eminently requisite for the amusement of the men, who, cut off from intercourse with the people, and without inducement even to walk out in so uninteresting a country, have hitherto resorted to grog shops, obtaining the most infamous liquors, as the only relaxation in their leisure hours.

6th. That the said barracks should in the mode and plan of their construction keep in view the protection of the men from tropical heat, as well as guarding them from excessive cold; and that they should be so planned as to obviate as much as possible the necessity for sentries—a duty which, from entailing exposure both to the heat by day and the dews by night, is, I believe, most adverse to the health of the European in China.

7th. That the wells should be sunk to a sufficient depth, to insure the water being uncontaminated by the innumerable sources of surface impurities that here abound; these should be, in fact, Artesian wells.

8th. That the men's diet should be fixed on a liberal scale, and as all articles are extremely dear at Shanghai, that the wealthy mercantile community, for whose protection the troops are quartered there, should be invited to contribute a certain sum, to be laid out in the improved dietary of the troops. I recommend also that the ration beverage should be porter, and never spirits.

Four marked characteristics distinguish the better class of the European community, who, I may observe, scarcely suffered at all during the two cholera epidemics, from their less fortunate fellow-countrymen the private soldiers, on whom the disease fell on both occasions very heavily.

1st. As a rule they (the civilians) all live extremely well, partaking of animal food always twice, and often thrice a day. 2ndly. They inhabit large airy dwellings, and never sleep, if at all possible to avoid it, on the ground-floor. 3rdly. They never expose themselves to the mid-day sun, and scarcely ever to the night air, except in covered (sedan) chairs. 4thly. They bathe in their own houses every morning, and in the afternoon, either by walking, riding, drilling as volunteers, playing rackets or otherwise they take care that the system has regular and sufficient exercise. I confess I see but little difficulty in giving the soldier the benefit of all these advantages. If his diet is improved, and I am inclined to lay much stress on this (utterly interdicting the use of salt provisions), his barracks made spacious and airy, sentry and all other out-door duty reduced to a minimum, if bath-rooms and the means of amusement and recreation above mentioned are provided for him, and if the European corps stationed at Shanghai, whether infantry or artillery, be not kept in China beyond the regulated period of three years, I see no reason why the soldier, even at Shanghai, should not approximate at least, if he does not actually reach, the high standard of health which the civilians in comfortable circumstances there enjoy.

EXTRACT FROM A REPORT ON THE SANITARY CONDITION OF HONG KONG AND KOWLOON, BY SURGEON SNELL, 99TH REGIMENT; AND CHART BY DEPUTY INSPECTOR-GENERAL HOME; WITH PROCEEDINGS OF A MEDICAL BOARD.

THERE can be no doubt that the climate of Hong Kong has a debilitating effect upon the European constitution, although, in many instances, it may fail in producing disease. The circumstances which give rise to this are, in my opinion, 1st. Its position within the tropics. 2nd. The situation of the town of Victoria on the north side of the island, which, during the summer, is the leeward side, all the strength of the S.W. wind being cut off by the high mountain ridge, at the foot of which the town has been built. 3rd. Some peculiarity of the soil, from which, though neither swampy nor marshy within the vicinity of the town, the miasmatic poison of intermittent fever is given off. 4th. From the very sudden and great changes of the temperature, often 10° to 12°, to which, during the winter months, all are exposed; and 5th, I would add with emphasis what applies specially to the soldier—exposure to the night air; the variations of temperature being greater at night and the fever poison more active, both fruitful sources of disease. I have, in the 99th Regiment, noticed the immunity from fever of all men who are not liable to night exposure—viz., the band, orderlies and messengers, staff-sergeants, privates in staff employ; also the prisoners in the garrison cells, who, although many undergo long terms of confinement, remain healthy, and are free from fever.

The Island of Hong Kong is one of a series of islands situated near the mouth of the Canton River, within a mile of the mainland of China; the position of the town of Victoria is in latitude 22° 18 N, longitude 114° 12 E. The island is 26$\frac{15}{100}$ miles in circumference of irregular outline, greatest length say 12 miles, being from east to west a series of steep mountain ridges occupying a central position, and over the town one point, Victoria Peak, reaches an elevation of 1774 feet. The adjacent mainland to the north is of a similar mountainous nature except the promontory of Kowloon, which juts out, and is a series of low, barren, undulating, rounded ridges, with alluvial deposits in very low, flat, swampy valleys. To the southward, with the exception of a few smaller islands intervening, the island is open to the sea and to the full and uninterrupted breeze of the S.W. wind during the hottest months in summer. Except in the valleys the soil is exceedingly scanty, the formation of the island being a peculiar red yellowish clay mixed with disintegrated granite, and large boulders of fine grey granite crop out in all directions, and give the appearance of a rocky formation; the boulders are found also in great quantities beneath the surface with, here and there, masses of basaltic trap. Removed from the town the alluvial deposits at the foot of the valleys are used for the cultivation of rice and succulent vegetables, water being easily obtained from the numerous streams for the purposes of irrigation.

The prevailing diseases are, 1st. intermittent fever, due to some unexplained, unfathomable influence of the soil, as near the situation of the barracks in Hong Kong there is neither swamp, marsh, nor jungle land, but that the predisposition to fever is influenced by night exposure I have not, from my observation, the slightest doubt. It is most prevalent during the summer months. 2nd. Continued fever, this with prominent head symptoms is an inevitable consequence of undue exposure to the sun's direct rays during summer, and sun-stroke under the same circumstances is not uncommon. 3rd. Dysentery, it is the most fatal in proportion to the number attacked of all the diseases; its season is during the winter months, when the temperature ranges very low and cold, and sudden variations, seem to be the exciting causes. 4th. Diarrhœa is prevalent during all the year, and often of the most intractable nature. 5th. Bronchitis and chest affections are also the diseases of the winter season, cold the exciting cause, but they are by no means numerous. 6th. Ophthalmia has also appeared in isolated cases, it is prevalent amongst the Chinese population, but with the soldier is not due to overcrowding of barracks or neglect of other sanitary measures.

BARRACK ACCOMMODATION.

Names of Stations and of Barracks during the past Year.	Date of Arrival at Barrack.	Monthly Average Number of Men occupying Barrack Rooms.	Average Monthly cubic Feet per Man in Men's Rooms.	Huts.	
				Monthly Average Number of Men in Huts.	Average Monthly cubic Feet per Man.
North and Murray Barracks at Hong Kong	15 Oct., 1861.	$578\frac{1}{3}$	651		
Mat and Bamboo Huts at Kowloon,	15 Oct., 1861.	.. ..	.. ..	$246\frac{11}{26}$	620
Chinese Building at Canton	Nov., 1862.	$22\frac{4}{13}$	800		

Except the interchange of companies between Hong Kong and Kowloon no change has taken place in the quarters of the regiment during the year.

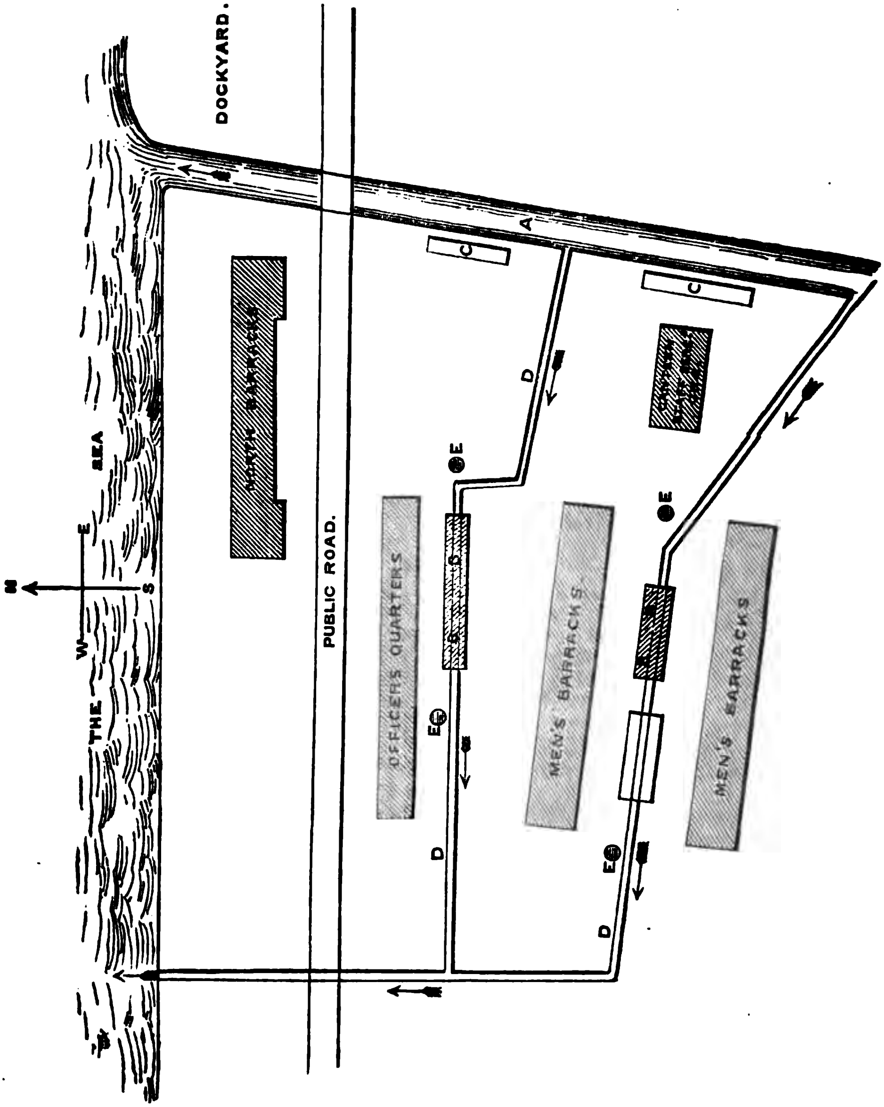
The position of the Murray Barracks in Hong Kong, in a valley partially closed in by higher ground both at the back and on either side, appears to have been ill chosen. During the summer the heat is very great, and the circulation of air deficient. At Kowloon the bamboo and mat huts are in the highest degree objectionable.

The general construction could not be better than in Murray Barracks, Hong Kong; but in the construction of the buildings all thought of accommodation for women and children seems to have been lost sight of. There are no quarters for married soldiers, and the limited space for the men precludes a barrack room being appropriated for that purpose. This is a serious consideration, and one which should be remedied.

Ventilation is generally good; warming during the winter is by coal fires in grates. During summer the men had punkahs pulled over their beds in both the barrack-rooms and guard-rooms at night, a source of great comfort, and an inducement for them not to sleep in the open air for coolness. The lighting in the staircases of the men's barracks by oil lamps is very defective; the Chinese steal the oil, and the lamps generally burn only a few hours. Several accidents, resulting in fractures, have occurred from men tumbling down stairs in trying to find their way to the privies during the night.

The bath and ablution rooms are good and ample. Bathing parades have been regular throughout the year, twice a week.

Drainage.—The whole system of drainage and sewerage in connection with Murray Barracks is defective: the position of both officers and men's privies, shut in by and in close proximity to the quarters and barracks, is in the highest degree objectionable; and the direction of the drains for carrying off the soil, running from east to west across the enclosure, and being on a higher level than the wells, from which a large supply of water is obtained, is a very serious evil. The following diagram will shew the present position of the privies, and the facility which existed and still exists in a large natural watercourse, with a fall of about 1 in 18 feet and a never-failing supply of water, for a proposed suitable site, marked C, for the privies, which would then be removed from the close proximity of the barracks. It is from this watercourse higher up that the supply of water is obtained to flow through the drains, D, which now traverse the barrack enclosure.



A—On the diagram is a granite paved large watercourse, emptying itself direct into the harbour, with a fall say 1 foot in 18, through which at all seasons a never-failing supply of water is carried off from the mountain stream to the sea, and from which higher up both the supplies of drinking water and for flushing drains are obtained.

B—Are the present positions of the men's and officers' privies; both drains D open at the privies with a supply of water running through, sufficient in the men's, but insufficient in the officers' to carry off the soil.

C C—Proposed suitable sites for officers' and men's privies; soil to be carried off by a straight covered drain, or large pipe, through which water would flow constantly, and drain or pipe to be continued beyond low-water mark.

E—Are four wells from which a large supply of water is raised by pumps for the supply of the barracks, it will be observed that the drains D are on a higher level than the wells, so that a certain amount of percolation must take place into the wells, a fact proved by the water taken from them containing sulphuretted hydrogen.

The stench arising from the officers' privies has been the subject of remarks or report in each monthly sanitary report, and latterly an attempt has been made to remedy their offensive condition by conducting wooden shafts from the drain through the roof of the buildings, so that the emanations from the drain are now carried to a greater height, and to a level corresponding with the lower verandah of the officers' quarters. The evil, viz., the drain, still exists; and until it is arched over and no longer used to carry off soil, it must continue a source of offensive emanations, and I have recommended in my monthly sanitary report that this should be done. Chairs with pans, such as are used in private houses here, could be substituted, and the soil removed twice, thrice, or oftener during the day.

Between the officers' quarters and the road, and on both sides of the officers' quarters, there has never been any attempt at surface drainage to carry off the enormous quantity of rain-water which accumulates rapidly after heavy showers. A large quantity runs off into the main road through the paths at each gate, rendering these paths small rivers during wet weather; but the greater portion lodges in front of the quarters, where it has no means of escape, and is absorbed into the soil. As all this position is overshadowed with large trees, the ground after wet weather remains for days and weeks in a damp sloppy state.

The main supply of water is conducted from a tank high up the valley behind the barracks, into which a portion of the mountain stream is directed. It is laid on by pipes in the cook-houses, bath and ablution-rooms. Water for cleaning purposes is mainly obtained from four wells in different parts of the barrack enclosure, but as they are all below the level of the privy drains, the water is undoubtedly unfit for cooking purposes.

DIET, &c.

Sunday.			Monday.			Tuesday.			Wednesday.			Thursday.			Friday.			Saturday.		
	lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.
Bread	1	4	Bread	1	4	Bread	1	4	Bread	1	4	Bread	1	4	Bread	1	4	Bread	1	4
Fresh meat	1	4	Salt pork	1	8	Fresh meat	1	4	Fresh meat	1	4	Fresh meat	1	4	Salt beef	1	0	Fresh meat	1	4
Vegetables	0	4	Vegetables	0	4	Vegetables	0	4	Vegetables	0	4	Vegetables	0	4	Vegetables	0	4	Vegetables	0	4
Tea	0	0¼	Peas	0	2	Tea	0	0¼	Tea	0	0¼	Tea	0	0¼	Peas	0	2	Tea	0	0¼
Sugar	0	1⅓	Tea	0	0¼	Sugar	0	1⅓	Sugar	0	1½	Sugar	0	1⅓	Tea	0	0¼	Sugar	0	1⅓
Porter 1⅛ pts.			Sugar	0	1½	Lime juice	0	0½	Porter 1⅛ pts.			Lime juice	0	0½	Sugar	0	1½	Rum	0	2½
			Porter 1⅛ pts.			Sugar for do.	0	0¼				Sugar for do.	0	0¼	Porter 1⅛ pts.					
						Rum	0	2½				Rum	0	2½						
Potatoes	1	0	*Potatoes*	1	0	*Potatoes*	1	0	*Potatoes*	1	0	*Potatoes*	1	0	*Potatoes*	1	0	*Potatoes*	1	0
Vegetables	0	4	*Vegetables*	0	4	*Vegetables*	0	4	*Vegetables*	0	4	*Vegetables*	0	4	*Vegetables*	0	4	*Vegetables*	0	4
Coffee	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½
Sugar	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1
Salt	0	0⅔	*Salt*	0	0⅔	*Salt*	0	0⅔	*Salt*	0	0⅔	*Salt*	0	0⅔	*Salt*	0	0⅔	*Salt*	0	0⅔
Pepper			*Pepper*			*Pepper*			*Pepper*			*Pepper*			*Pepper*			*Pepper*		

BREAKFAST AT 7·30 A.M.

	lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.		lbs.	oz.
Bread	0	8	Bread	0	8	Bread	0	8	Bread	0	8	Bread	0	8	Bread	0	8	Bread	0	8
Steak	0	8	Fried pork	0	4	Steak	0	8	Steak	0	8	Steak	0	8				Steak	0	8
Coffee	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½	*Coffee*	0	0½
Sugar	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1	*Sugar*	0	1

DINNER AT 1 P.M.

lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.
Fresh meat., 0 12	Fresh pork.. 1 4	Fresh meat . 0 12	Fresh meat.. 0 12	Fresh meat.. 0 12	Salt beef.... 1 0	Fresh meat.. 0 12
Soup 1 pint..	Peasoup 1 pt.	Soup 1 pint	Soup 1 pint	Soup 1 pint	Pea soup 1 pt.	Soup 1 pint
Bread 0 4	Peas 0 2	Bread...... 0 4	Bread...... 0 4	Bread...... 0 4	Peas....... 0 2	Bread...... 0 4
Vegetables .. 0 4	Bread...... 0 4	Vegetables.. 0 4	Vegetables.. 0 4	Vegetables.. 0 4	Bread...... 0 4	Vegetables.. 0 4
Porter 1⅛ pint	Vegetables.. 0 4	Rum 0 2⅓	Porter 1⅛ pt.	Rum 0 2⅓	Vegetables.. 0 4	Rum 0 2⅓
	Porter 1⅛ pt.	Lime juice.. 0 0½		Lime juice.. 0 0½	Porter 1⅛ pt.	
		Sugar...... 0 0¼		Sugar...... 0 0¼		
Vegetables .. 0 4	*Vegetables*.. 0 4	*Vegetables*.. 0 4	*Vegetables*.. 0 4	*Vegetables*.. 0 4	*Vegetables*.. 0 4	*Vegetables*.. 0 4
Potatoes 1 0	*Potatoes*.... 1 0	*Potatoes*.... 1 0	*Potatoes*.... 1 0	*Potatoes*.... 1 0	*Potatoes*.... 1 0	*Potatoes*.... 1 0
Salt....... 0 0⅔	*Salt* 0 0⅔	*Salt* 0 0⅔	*Salt* 0 0⅔	*Salt* 0 0⅔	*Salt* 0 0⅔	*Salt* 0 0⅔
Pepper	*Pepper*	*Pepper*	*Pepper*	*Pepper*	*Pepper*	*Pepper*

TEA AT 4·30 P.M.

Consisting of Tea......................	0¼ oz.
Sugar................................	1⅓ oz.
Bread................................	8 oz.

Articles in this Scale in Roman Type constitute the Commissariat Ration at a stoppage of 4½*d.* a-day. Those in *Italics* the articles purchased by Companies at a stoppage of 2*d.* a-day.

About the half of the men provide themselves with a cup of coffee at their own expense at daylight, the same being obtained from a Chinese contractor and brought to the men's beds. Although a late evening meal is not provided by any regulation, still the majority of the men provide one for themselves, purchasing fried fish or eggs from a Chinese contractor who lives in barracks. A late night meal for men on guard is as a custom provided by the men themselves, who keep a portion of their day food to eat at night; their comrades in barracks always send a larger proportion of the dinner ration to the men on guard. Besides the 4½*d.* per diem stopped for rations and 2*d.* per day for companies' messing, the generality of the men spend from 1½*d.* to 2*d.* a day for extras in the way of food, viz., eggs, butter, fish, cheese, &c. The amount of vegetables is sufficient.

The rations issued to the troops have been good, but I consider that the issue of salt meat should cease, as unnutritive and unsuited for this climate. The substitution of porter for daily issue in place of rum should be adopted, and in addition to the above scale I would recommend the addition of 2 oz. rice daily and 8 oz. of fresh meat for men on guard only, to enable them to have a night meal. These recommendations were given by me as evidence before a Special Committee appointed to investigate the present diet of the soldier in China.

The cooking arrangements are good; the soldiers have the means of roasting their meat when they like; but, whether from taste or force of habit, they as a body prefer soup and boiled meat.

The liquors sold at the canteen in barracks have been rum, porter, and ale on draught, all of the best quality. The spirit sold in the town is of the most villainous description; a coarse new raw spirit called "Samshoo," intoxicating in the highest degree, can be obtained at as low a rate as 3½*d.* per bottle.

Clothing.—To suit the degrees of temperature and different seasons, the men have three descriptions of clothing—1st. The English shell jacket, with cloth and serge trousers, and forage cap for winter. 2nd. A red serge loose tunic, with serge trousers and helmet for warmer weather. 3rd. Tunic and trousers of cotton karkee, with helmet, for hot season. During the coldest months the English cloth tunic is worn on guard, and at night the great coats, both well suited to protect men exposed to the sudden changes of temperature at that season.

Duty.—The only duties performed by the men of the 99th Regiment have throughout the year been guards, garrison, and regimental. The guard duties have been severe, and the average number of nights in bed have been—serjeants, 5; corporals, 3; privates, 3, which, during the hot season, might be called excessive duty. Duties requiring labour or exposure during the hot weather should be thrown on native troops.

Two parades a day throughout the year, in the summer before 7 a.m. and after 5 p.m., in the winter 10 a.m. and 4·30 p.m, two drill days during the week at afternoon parades; neither parades nor drills are excessive, and have no injurious effect on the health of the men.

Means of Recreation.—1. Two covered-in skittle-alleys; 2. One American bowling-alley (covered in); 3. One covered-in gymnasium, well equipped; 4. A cricket-ground and full complement of bats, balls, &c., for the enjoyment of this game from about 1st November to 1st April; 5. Two billiard tables, two bagatelle tables, drafts, chess, backgammon, and numerous games, in the Soldiers' Institute where men can purchase tea, coffee, cheese, butter, bread, &c. All these means of recreation are eagerly sought after, and conduce in every way to health.

The sanitary condition of the garrison prison cells has been most satisfactory, and the health of the prisoners, most of them drunkards, has been better than that of men at their duty. I attribute this and their immunity from fever to the fact of their having no night exposure. Their diet is less than that of men at duty, but the regular life they must lead, with a judicious amount of exercise and every night in bed, have certainly a marked effect in keeping them free from disease.

HOSPITAL ACCOMMODATION.

Name of Hospital.	Average Number of sick in Hospital wards.	Average Monthly Number of cubic Feet per Patient.	Huts.	
			Average Number of Sick in Huts.	Average Number of cubic Feet per Patient.
Hong Kong General Military Hospital.........	$57\frac{317}{365}$	1063		
Mat Huts at Kowloon........	.. ..	.. ..	27	800

The ventilation and warming of the hospitals have been satisfactory, and there has not been any overcrowding.

The drainage in the hospital building, Hong Kong, is faulty. Means have been taken from time to time to remedy this, but from the peculiarity of construction of the drains, or the want of traps, the emanations are often offensive. The water-closets on the upper story are not used for this reason.

ZYMOTIC DISEASE.

Fevers, chiefly of intermittent type, dysentery, and diarrhœa, have prevailed as the diseases of the country, and were not attributable to any defect in sanitary arrangements, diet, clothing, extra and excessive duty, or unnecessary exposure. Six cases of cholera occurred during July and August; they were isolated, at different periods, the disease appearing under different circumstances and from different localities in each man, and not attributable to any faulty sanitary condition. The high rate of fevers compared with last year I attribute to the cessation for seven months of the issue of quinine daily; this was stopped on 28th November, 1862, and not resumed till July, 1863, during which period the increase in cases of intermittent fever was most marked; during the intermission all the exciting influences of a malarious climate were acting on the constitutions of the men, inducing debility, so that when direct causes of influence arose, such as extreme heat, direct rays of sun, or exposure, the poison of the fever, which had been contracted and remained unchecked in the system, produced its effects. The tendency to repeated recurring attacks of intermittent fever in the greater bulk of the men can be traced to their residence at Kowloon, which station, in its present state, I look upon as a most fruitful source of fever to the European constitution. The emanations and exhalations from the low alluvial flats in all the valleys, constantly kept irrigated to induce rapid growth of paddy and rank vegetables, being quite sufficient to account for the exciting cause of fever; if the peculiar fever-producing influences well known to exist in the ordinary soil (not under cultivation) of Hong Kong and Kowloon did not exist, Kowloon must continue an unhealthy station as regards fever for any Europeans stationed there—the longer the residence the more liable will the soldier be to the attacks of intermittent fever till, 1st, all rank vegetation and irrigation has been stopped; 2nd, the low garden grounds and swamps drained and filled in; 3rd, proper permanent barracks well elevated from the ground, with broad verandahs, have been built, to enable men during the hot season to leave the actual barrack-rooms without going into the direct rays of the sun; and 4th, all digging and breaking up of the virgin soil has ceased, and the new surface covered by buildings, roads, cheenam, suitable grass, &c., and well planted with trees. Hong Kong I look upon, in comparison to Kowloon in its present state, as a sanatarium; and the injury to the health of the men of the 99th Regiment, from their lengthened period of service in China, I consider is chiefly due to the debilitating effects of fever, contracted for the most part at Kowloon in turns by each company taking their turn of duty there. With regard to quinine as a prophylactic for intermittent fever I have the greatest faith. Four grains have been issued daily to the men at Kowloon, and two grains to the men at Hong Kong; but an extract from my communication to Dr. Home, principal medical officer, on the subject, will shew my views further with regard to the exhibition being made a compulsory matter. "I would point out the difficulty experienced during a period of six months to get the men of the 99th Regiment to come forward voluntarily to take the quinine mixture *daily*, and would strongly urge the necessity of adding a small quantity of common wine or rum, and thus make the issue an authorised ration, so that the matter be no longer left to the men's discretion, as I have found that many men either will not take the trouble or have an objection to quinine mixture unless they are liable to attacks of fever—the issue being made a compulsory measure would obviate any matter of inclination, and make it one of certainty." This recommendation has not been acted upon, although I am aware the authority of the Major-General Commanding has been obtained to the issue of a small ration of spirit for the purpose.

General Conclusions.

In drawing any comparison between the average daily or monthly sick and the number of admissions to hospital of the men of the 99th Regiment, with other corps serving in the command, it must be borne in mind that in the 99th Regiment no system of convalescents is allowed, every man not fit for duty from the slightest cause is in hospital and on diet, so that a large sick list in appearance may often represent numbers of trifling cases, and such as are treated out of hospital and not recorded in other corps, but which, in the 99th, swell the returns, and give an increase to the average. That the health of the men of the regiment has suffered during a continued residence of more than three years between Canton, Hong Kong, and Kowloon cannot be denied, the debilitating effects of repeated attacks of intermittent fever being the chief cause, but from all causes the rates of mortality and sickness have not been high, and far below what, in former years, gave to Hong Kong the unenviable reputation of being a most sickly station. The apparent change in the influences of the climate of Hong Kong on the European constitution are due, in my opinion, to 1st and mainly, that the virgin soil, except on the outskirts of the town, is now very little disturbed, all the building sites being nearly occupied, for it was a well-certified fact that in former times, when the surface of the ground was broken and excavations carried on in that vicinity, fever was sure to appear, and was attributed to the exhalations from the disintegrated granite soil. 2nd. To the original surface of the soil being now in the town covered with buildings, roads, gardens, and at all available places well-planted with trees. 3rd. An improved system of drainage. 4th. A liberal and ample supply of water; and 5th, the substantial and well-elevated dwelling-houses, and the custom of no one sleeping on the ground floor; but with all the improvements in the sanitary condition. I look upon a residence longer than three years as very trying to the European constitution, as fully proved by the number of men already invalided and to be invalided from the 99th Regiment. If any consideration is given for the health of a corps it would be sound policy on the part of the Government never to extend the detention of a regiment in the south of China for more than three years, and as a matter of finance the heavy cost of invaliding would to a certain extent be curtailed, and risk of impairment of efficiency of a corps for service afterwards in any other climate be avoided.

The so-called Sanatarium established at Victoria Peak, say 1,670 feet above the sea level, proved last year (except in two surgical cases) an utter failure—nearly every case sent was attacked with diarrhœa of an intractable nature, and I attribute the acceleration of death in four cases to their residence there. Seventeen men were sent, mostly cases of debility after fever, the changes in all except two (bubo and ulcers), as before stated, were for the worse; due, in my opinion, to the general insalubrity of the position, the sudden alternations of heat and cold, and the dampness from being generally immersed in clouds. Even at that elevation cases of intermittent fever were liable to as regular attacks as when on a lower level. From my own experience I would consider I was wantonly risking men's lives to recommend at a future time any medical case for change from Hong Kong or Kowloon to Victoria Peak Hospital.

99TH
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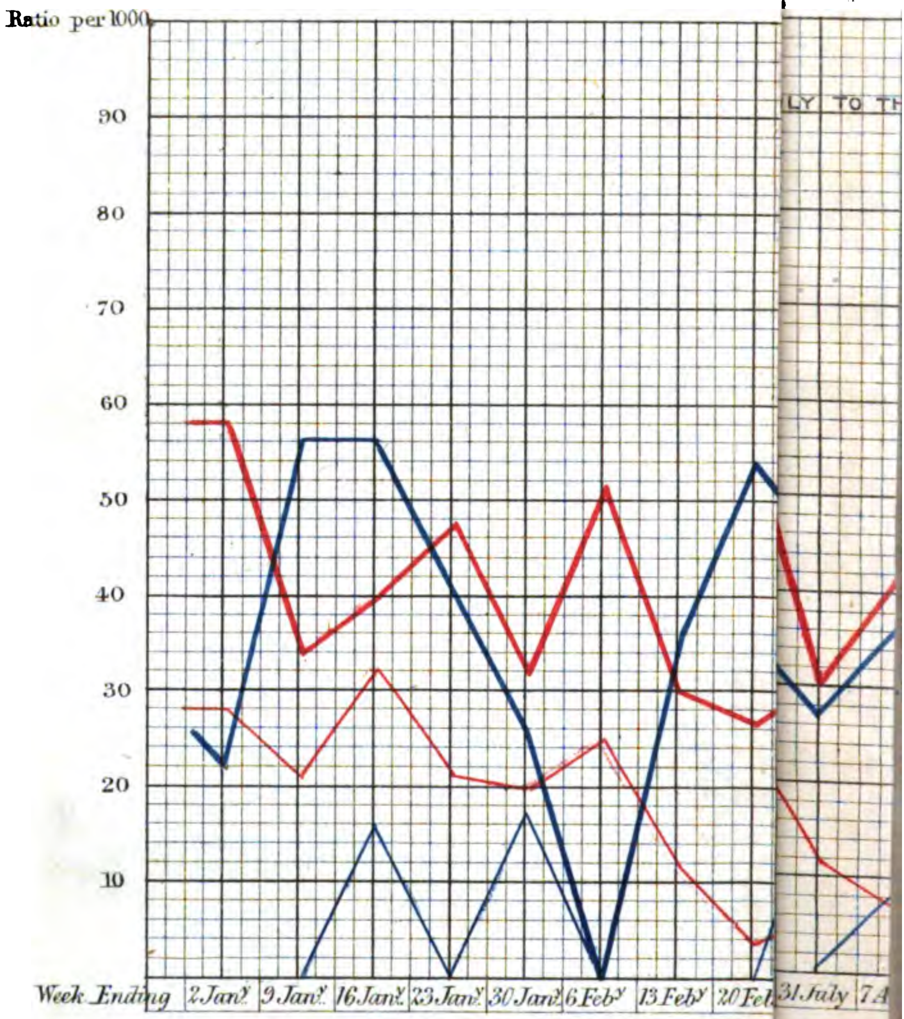

This Diagram is intended to show that ma successiv
The Artillery never have been quarterd the year lo
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The strength of Artillery being about 100 habit
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Principal Medical Officers Office Hong

In concluding this report I cannot omit a few observations on the increased mortality which has arisen, and the disheartening effect on the sick soldiers, whose health has been broken down by climate, produced by the delay and uncertainty in the despatch of invalids. In May, 1863, an Invaliding Board sat at Hong Kong, and 45 men of the 99th Regiment were declared unfit to remain in the country; delay after delay occurred through reference having to be made to the Admiral, then at Japan, and it was not till 15th September that these sick men were despatched, three of them having died in the mean time; the impaired health of the others had also deteriorated by their being kept throughout the hottest and most unhealthy months. From an unhealthy station like China a regular system of transport for invalids at stated periods (say twice or thrice a year, or oftener) should be established, it would tend to add an amount of cheerfulness to the broken down soldier, who, under the present uncertainty, despairs of recovery, and though he pines for change and is buoyed up by the prospect of getting to England, still becomes disheartened by delays, and often sinks before an opportunity (seldom beyond once a year) offers for his removal.

The chart prepared by Deputy-Inspector General Home is corroborative of the conclusions arrived at by Surgeon Snell.

The following Extracts from the Report of the proceedings of a Medical Board convened subsequent to the date of Surgeon Snell's report*, tends materially to substantiate that officer's views.

The Medical Board convened by General Order to enquire into such matters as may be brought before it, and with reference to instructions from the Deputy Assistant Adjutant-General, has the honour to report for the information of the Major-General Commanding.

President.

Deputy Inspector-General of Hospitals, Dr. Dick.

Members.

Staff-Surgeon F. W. Moore.
Assistant-Surgeon A. R. Smith, R.A.

The Board having assembled, and having considered these instructions, it appeared to it convenient that the questions proposed for its investigation should be arranged as follows:—

1st. As regards the general sanitary condition of the military station of Kowloon.

2nd. As regards the recent outbreaks of disease which have occurred in the 99th Regiment since it has been stationed at Kowloon.

3rd. As regards the deaths of Private Sullivan and others of the 99th Regiment, and the circumstances attending them, as requested in the Commandant's letter of the 29th October, 1864.

I. With regard to the first question, considerable difficulties present themselves with respect to the earlier medical history of Kowloon, the statistical reports emanating from that station may lead to a fallacious conclusion, in as much as they show only the station at which diseases first manifested themselves, without giving any clue to that at which they really originated. From the frequent interchange of detachments, for instance, many of the cases of fever which appeared in the Hong Kong returns may really have resulted from infection at Kowloon, and, on the other hand, cases of this disease which appear in the Kowloon returns may have originated at Hong Kong, so that until December, 1863, when Kowloon was occupied by the 2nd Battalion 20th Regiment, no positive conclusion can be drawn from these returns without tracing the history of each separate case of disease occurring at either station from August, 1860, when Kowloon was first occupied as a military post, to the date just mentioned.

The other documentary evidence is still less conclusive; for while, on the one hand, Kowloon has been represented as superior in a sanitary point of view to the island of Hong Kong, it has, on the other hand, been described as

* November, 1864.

very far inferior to it. This apparent discrepancy might perhaps be reconciled if the circumstances under which each separate report was written could be properly ascertained, for it is very possible that even Kowloon might have been comparatively healthy at one period, and quite the reverse at another, which indeed has been the case even during the present year.

The general effect of the evidence taken in the course of this enquiry will be considered by the Board, and the evidence itself will be attached to this report as an Appendix.*

But, in the first place, it is necessary to the objects of this investigation that a broad distinction should be drawn between the present and former sanitary condition of Hong Kong, and the evidence of Mr. Fisher, one of the oldest and most respectable inhabitants of the colony, shows what that condition once was, and what it now is; and had one of the questions proposed for the consideration of the Board been whether the actual sanitary condition of Kowloon is superior to the former sanitary condition of Hong Kong, there would have been no hesitation in giving an affirmative reply, or had the question submitted been whether, in the opinion of the Board, Kowloon (possessing as it does the undoubted sanitary advantage of being open to the influence of the south-west monsoon, which prevails during the hot season) might not be rendered even more salubrious than Hong Kong is at present? the answer would be that with efficient drainage the protection from solar influence afforded by trees, the erection of good substantial buildings well ventilated, and a supply of wholesome water for drinking purposes, it would have every reason to anticipate the desirable and beneficial result indicated, but it is the duty of the Board to deal with matters as they are, and not as they have been or may hereafter be.

The 2nd Battalion 20th Regiment occupied Kowloon from December, 1863, and remained there until the end of June of the present year, about which time it embarked for Japan.

During the first three months its sanitary condition was good, but in April some cases of fever appeared, and they gradually increased until the 17th June, when the weekly percentage of sick amounted to 14·165, and the number of fever cases to 73. After this date the regiment was encamped on the Kowloon Peninsula for some short period, and within the next two months no fewer than 20 deaths occurred in it, of which 12 were from cholera, 5 from diarrhœa, 1 from fever, and 2 from apoplexy, and there is only too much reason to fear that the germs of 18 of these fatal diseases were sown during the latter portion of the period the corps was quartered at the station just named.

The testimony of Surgeon Snell, 99th Regiment, and of Staff-Assistant Surgeon Beath, M.D., shows that during the year 1863, the garrison of Kowloon was principally furnished by the 99th Regiment, and that it was relieved several times by detachments of the same corps, and that a considerable increase of the general regular sick list, in each instance, followed the return of these detachments to Hong Kong; the men having contracted fever and other diseases when stationed at Kowloon. Staff-Assistant-Surgeon Beath also states, that while Dr. Home was Principal Medical Officer in China, he was employed by him to draw up a table of the percentages of sick at Kowloon and Hong Kong respectively, for a period of three years; and that on the whole, those of the former exceeded the latter by about 33 per cent.

The evidence of W. H. H. Scott, Esq., Acting Barrack Master, shows that the huts occupied by the troops at Kowloon are most of them mat huts, which do not, in his opinion, afford sufficient protection from ordinary vicissitudes of weather.

The evidence of Major Brine, R.E., shows that extensive marshes and abandoned paddy-fields exist on two sides of the military station.

The evidence of Staff-Assistant-Surgeon Curtis shows that he was employed by the Principal Medical Officer to analyse the water used for drinking purposes by the troops at Kowloon, and that he found it of bad quality, and unwholesome in its native condition.

Taking all these circumstances into its mature and anxious consideration, the Board is of opinion that the sanitary condition of Kowloon is and has been unsatisfactory, and that no proper means have been adopted to improve it.

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* The evidence in detail has not been printed.

It is of importance to this part of the investigation, that the Board should here refer to some of the most obvious causes of fever, and to the periods of time which observation has shown generally elapsed between the reception of the infection and the invasion of febrile diseases; these have been termed the periods of incubation.

The ordinary exciting causes of fever are cold, miasmatic influence from marshes, emanations from the ground, or from cesspools, and other receptacles of filth, and from direct contagion, which however, is believed to be confined chiefly to fevers of a putrid character, and to certain eruptive fevers, while the fever arising from cold is usually ephemeral, and quickly disappears.

The predisposing causes of fever may be described generally as those which lower the general health, and among them may be classed undue exposure to solar influence and night duties.

The period of incubation is very uncertain, and may vary from a few hours to 42 days; but the ordinary period between the infection and the invasion may be stated at 7 to 21 days.

The principal facts with reference to this part of the investigation which appear in the evidence before the board, are as follows:—

On the 6th of September last, H.M. troop-ship "Adventure," arrived at Hong Kong from England, having on board the 8th Battery, 2nd Brigade, R.A., and a draft of 60 men of the 67th Regiment, and the evidence of Assistant-Surgeon Smith, R.A., shows that up to that period these two bodies of men had been very healthy. The battery of R.A. disembarked at Hong Kong, where it is still quartered; the draft of the 67th Regiment at Kowloon, where it remained for a period of ten days.

When the 8th Battery, 2nd Brigade, R.A., landed at Hong Kong, the 6th Battery, 12th Brigade, proceeded to Kowloon; many of the men had previously served in China for a period of eight years, and some of them had never before been affected with fever.

The evidence of Lieutenant Cane, the commanding officer, shows that up to the arrival of this battery at Kowloon it had been very healthy. It remained there for eight days, when it returned to Hong Kong. The subsequent medical history of the draft of the 67th Regiment appears in the evidence of Surgeon Snell, 99th Regiment; that of the 6th Battery, 12th Brigade, R.A., and 8th Battery, 2nd Brigade, R.A., in the evidence of Assistant-Surgeon Smith of that corps; the general effect of which is, that while the health of the two bodies of men stationed at Kowloon (the one having just arrived in the colony, the other having served in it for years), soon afterwards became very bad, and that much fever prevailed amongst both; while the health of the 8th Battery, 2nd Brigade, R.A., which had been disembarked at Hong Kong, has been, and continues to be, very good. The obvious inference, therefore, is that the bad health of the first, viz., the 6th Battery, 12th Brigade, R.A., and draft 67th Regiment, was caused by residence at Kowloon.

The evidence of Assistant-Surgeon Wheately, 22nd Bombay N.I., shows that a detachment of his regiment, 165 strong, was quartered at Kowloon from the 29th of June to the 15th of September last, and that the head-quarters, 465 men, were stationed at Hong Kong; that previous to the first date, the men of that detachment had been healthy; that while there stationed, fever had began to prevail among them, and that after its return to Hong Kong, 162 cases of fever occured in his corps, and of that number, 117 cases were from the Kowloon detachment, being in the proportion to respective strength of 78 per cent. of the Kowloon detachment, and rather under 10 per cent. of the head-quarters. The inference, therefore, is that most of these 117 cases originated at Kowloon.

On the 15th of September, the 99th Regiment was ordered to Kowloon; for a considerable period previously it had enjoyed good health. For two weeks after its arrival there, the health of the corps does not appear to have been seriously affected, although the number of sick had increased.

On the 7th of October there was a great increase in the number of sick, caused chiefly by fever. The number of fever cases continued to increase until the 14th of that month, when it amounted to 81; it afterwards decreased, and went on decreasing until the 25th of October. But about the 29th of the same month, a fresh invasion of fever occurred, and went on extending until the 19th of November, when the number of fever cases in hospital amounted to 117.

The obvious inference, therefore, again is that the health of the 99th Regiment has been greatly deteriorated, and its efficiency impaired by influences existing at Kowloon.

The evidence of Major Brine, R.E., and Lieutenant Williams of that corps, shows that cuttings on an extensive scale were first commenced on 9th August, 1864, at Kowloon, and continued until the 17th of September, and that these cuttings were in close proximity to a portion of the barrack buildings. At the above date they were discontinued; but new cuttings, at a greater distance from the buildings, were commenced about the same time; and that the newly turned-up earth from these second cuttings was brought to a point farther from the barracks than the first cuttings, but much nearer than the others, and used in the formation of a Government road just under them.

That the original cuttings were recommenced on the 20th October, and were being then continued, and that some portions of these are within a few yards of the huts.

It appears further, from the evidence of Mr. Thwaites, that on the day following the removal of the 99th Regiment to Kowloon, and some time before any extraordinary sickness appeared among any portions of the troops, the attention of the commandant was specially directed to the danger likely to be caused to the health of that corps by the continuance of the cuttings, and that the Principal Medical Officer pointed out in his letter that fever was likely to result therefrom.

That other letters were addressed to him having reference to the same subject on the 26th September and 6th October; and it certainly is a coincidence, that disease in the particular form indicated by the official sanitary adviser of the military authorities, appeared within a very short period from the date of his first letter. But the Board does not regard this circumstance as of itself conclusive testimony that the subsequent sickness of the 99th Regiment was caused by the cuttings then going on, as other causes of fever might exist at Kowloon, but only as a connecting link in the chain of evidence.

But there are other considerations; the amount of sickness at Kowloon had never been before so great as it lately has been, while the cool and dry state of the weather has been unfavourable to the propagation of fever by ordinary miasmatic influences. No cesspools or other receptacles of filth exist at the station, with the exception perhaps, of a tank of foul water, kept there for use in cases of fire; and as regards the influence of cold, by far the greater number of the fever cases have not shown any of the characteristics of febrile affections arising from this cause alone.

Notwithstanding the rather inconsistent testimony of Dr. Murray, the Colonial Surgeon, who is not friendly to, though he does not ignore the theory, that the former prevalence of fever at Hong Kong resulted from exposure of fresh earth, a general opinion does exist, and has existed for many years, that the turning over of virgin soil had much to do with its production in the early days of the colony. And the testimony of Mr. Fisher shows, as a matter of fact, that when what he calls the Hong Kong Fever was at its worst, many years before Dr. Murray became a resident, much fresh earth was being turned up; and Major Brine, R.E., who has been some years in China, says in his evidence, that his impression is, that turning up of earth and excavating for public works, conduce to sickness among the Europeans; and Deputy-Inspector General Mackay states, as a matter of fact, that since the cuttings at Kowloon had commenced, fever had been more prevalent on board H.M. hospital-ship "Melville" than it ever was before.

The evidence of Dr. Shetleg, who has had six years' experience in the colony, shows that he has met with many cases of fever which, in his opinion, resulted solely from the turning over of fresh earth, and the exposure thereby of disintegrated granite, and he is of opinion that it is at all times a fertile source of fever. And, as a matter of direct testimony, the Board beg to refer to the very strong and decided statements of Mr. Rawlings, a man, perhaps, of as great practical experience in building operations as any person now in the colony (having superintended the building of over 300 houses), which clearly shows that the natives of China themselves are not exempt from the injurious influences arising from the turning over of fresh earth.

It also results from a comparison of dates, that extraordinary coincidences have existed between the progress and localities of the cuttings at Kowloon, and some of the accessions of fever which have occurred lately at that station.

The draft of the 67th Regiment and the 6th Battery, 12th Brigade, R.A., arrived there when the cuttings were going on in the immediate vicinity of the barrack huts, the results were similar in both cases, and need only again be referred to in this place.

The 99th Regiment arrived at Kowloon while the same cuttings were still in progress, and though they were discontinued two days afterwards, much fresh earth was still exposed, and fever supervened just about the period it might have been expected to appear, if it resulted from the injurious influence of these cuttings.

The evidence further shows that the cuttings nearest the military post, and almost in contact with some of the barrack buildings, were resumed on the 20th of October, at which date fever had greatly decreased in the 99th Regiment; and then again, a new accession of fever occurred just at the period that might have been anticipated, if it could be demonstrated with the accuracy of a mathematical problem that the infection had been the result of the malarious influence of the newly turned up earth.

This second accession of fever went on increasing from day to day until it predominated to an extent before unknown in the regiment.

But if anything is still wanting to place the pernicious influence of these cuttings on the health of the 99th Regiment beyond doubt, the Board has only to refer to the testimony of Assistant-Surgeon Keraus and Lieutenant and Adjutant Ffolliott of that corps, by which it appears that of twelve officers who lived in a range of quarters immediately overlooking the cuttings, nine have been more or less seriously affected with fever; and that of six officers quartered in another range of buildings at some distance from them, only one has had fever.

Major Brine in his evidence has suggested that the large proportion of fevers among the officers living in the first range of buildings may have resulted from fermentation taking place in the bamboo leaves entering into the composition of the huts, through moisture and heat; but it must be remembered that the construction of both ranges is similar, and that the weather has been comparatively dry and cool; further, it has been ascertained by the personal inspection of the Board, that no apparent difference exists between the condition of these two ranges of huts; moreover, Major Brine has himself stated that he considers both ranges of huts in tolerable repair.

The Board, on review of the whole evidence affecting this question, is of opinion that though the ordinary causes of disease existing at Kowloon may have operated in its production in an inferior degree, yet that the recent outbreaks of sickness in the 99th Regiment were mainly produced by the malarious influences of the cuttings which have recently been going on there; and the Board is further of opinion that had these cuttings been effectually stopped in the first instance, much of the sickness and mortality which has since ensued would not have occurred.

The Board having given its attention to the letter of the Commandant, dated the 29th of October, and referring to the evidence of Lieut. and Adjutant Ffolliott, Assistant-Surgeon Keraus, and Sergeant-Major Short of the 99th Regiment, has not been able to discover any circumstances in the mode of life of Private Sullivan, for some days previous to the accession of his fatal fever, which can warrant it in coming to the conclusion that his death was hastened, or his fever induced, by any excess or imprudence on his part.

The same observations apply to two other fatal cases of fever which have since occurred in the 99th Regiment, viz., to those of Sergeant Carter and Private Fagan, and the only opinion at which the Board can arrive, with reference to these cases, is that death was the result of the malarious influences indicated in the previous conclusion.

INDIA.

EXTRACT FROM THE GENERAL SANITARY REPORT OF THE MADRAS PRESIDENCY FOR 1863.

By Deputy Inspector-General Inglis, C.B.

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The stations at which cholera prevailed during the year were—epidemically at Thayetmyo in Burmah in April and May, and partially so at Arcot, towards the end of the year among the men of the 2nd Battalion, 21st Fusiliers, shortly after the battalion landed. At many of the other stations this disease is apparently endemic, particularly in the native town of Madras, one of the filthiest and insanative in India, crowded with a squalid population, and affording a nidus for untold "materies morbi;" in short, a very centre and focus of insalubrity, and from whence it may be safely assumed, when cholera prevails among the troops stationed in Fort St. George in any degree, modified or otherwise, it is derived from the sluices of this polluted town. There is a vast field for sanitary improvement here, and with the naturally good position of Madras on the Coromandel coast, exposed freely to the sanative influences of the open ocean, there is no reason why the elements which incubate cholera and other miasmatic diseases should not be quickly disposed of. It is not with Madras and its neighbourhood, however, I have to do now, especially with reference to cholera, as both at that and many other stations such as Kamptee, Bangalore, Bellary, Secunderabad, &c., it occurred only during the period under record in this report in occasional sporadic cases, but never assuming the dimensions of an epidemic. It was in British Burmah, at Thayetmyo, up the Seytang River, that an outbreak of severe malignancy, but fortunately of no long duration, resulting in the loss of two officers, viz., Surgeon Sparrow and Captain Hazen, together with 17 men and 2 women of the left wing, 3rd Battalion, 60th Rifles, and 4 men of G Battery, 23rd Brigade, Royal Artillery, manifested itself. Shortly after becoming cognizant of the eventualities mentioned, I forwarded full reports; but as the particulars are still of sufficient interest for inclusion in this paper, I shall epitomize as many sentences collected from the facts communicated as may be interesting.

The seized officers and men collectively at Thayetmyo while the choleraic epidemic lasted, viz. from 21st April till it finally disappeared about 16th May, amounted to 38, and of that number 21 perished,—more than half,—sad evidence of the intensity of the poisonous emanations giving rise to the outbreak. The first cases were supposed to have originated from eating unripe mangoes and fresh pork, and to the latter article of diet in India, I may make passing mention, is frequently ascribed the exciting cause of outbreaks of cholera. It is assumed, however, that in the two first cases the error in diet alluded to only operated in developing symptoms probably latent, the true etiology of the outbreak being obscure, and attributable to other conditions. An opinion was hazarded that atmospheric products operating on a quantity of decomposed old thatch, which had been removed from huts undergoing repair, and thrown down on the banks of the river when the disease first broke out, brought about the peculiar combination or germ incubating the concentrated poison which quickly and with such fatal effect diffused itself throughout the neighbouring barracks; the Medical Officer did not consider the state of cesspools or drains such as to have anything to do with it. It was brought to notice that the European Barracks in which the disease appeared are built close to the river bank, and consequently much exposed to noxious emanations arising from decomposed vegetable and organic products, which, acted on by the excessive heat at a season of the year when the river also is very low, may have been specifically exposed to the morbific agencies referred to, particularly as the native lines at some distance from the river were exempt. There is much in this opinion, and believing that the products giving rise to cholera are constantly being matured on the littoral of Indian rivers, as, for instance, the Ganges, I consider it unfortunate that the European barracks at Thayetmyo should have been constructed in such close proximity to what may again, under favouring conditions, occasion a serious amount of disease.

Cholera made its appearance first in the huts situated nearest the bank of the river, and the most southerly part of the lines of the 3rd Battalion, 60th Rifles; it was at first confined to that regiment, but afterwards made its way northward to the lines of the Royal Artillery. The sanitary precautions adopted were judicious. When the disease appeared the men were moved out of barracks and distributed under canvas, and in other buildings in the neighbourhood removed from the focus of the epidemic. It is said the wing could not be removed to a distance or marched, owing to want of tents. All the huts and hospital were carefully exposed to the fumes of coal tar and other deodorents and disinfecting substances. They were whitewashed, and all accumulations of old thatch, bamboos, &c., were carefully removed. It would appear that the disease subsided with as much celerity as marked its invasion, and it was communicated to no town or village in the neighbourhood so far as could be discovered. The peculiarities of attack and subsidence would certainly indicate the etiological feature of the outbreak to be connected with peculiar physical and atmospherical states operating on the decomposing vegetable and organic products at the low fluvial level described, and the sudden cessation, to the removal of all fermenting elements requiring meteorological conditions for their development. It is not noted that diarrhœa prevailed antecedent to the outbreak, but, concomitant and consecutive to it 35 acute cases of that disease are recorded.

It is recorded in connexion with meteorological phases, that the thermometer had a rapid fall on the 21st April (day of invasion), that the barometric range varied but little. On the 21st April alluded to, and during the epidemic, the atmosphere was extremely oppressive, slight showers of rain falling at intervals, which seemed to exercise no influence on the course of the epidemic. There was no thunder or lightning during the outbreak, and the Medical Officers conjecture there may have been a want of ozone and nitric acid in the atmosphere; but this is only an hypothesis, as no experiments were instituted.

The 2nd Battalion, 21st Fusiliers, disembarked at Madras in the first week of November, and for a time distributed at Fort St. George, St. Thomas' Mount, and Arcot, were assembled ultimately at Bangalore, till moved by transit to Bellary. During the sojourn of the regiment at Arcot, cholera of a mild type, returned by the Medical Officer in charge, Surgeon-Major Mackintosh, as "cholera biliosa," appeared, and occurred in cases sufficiently numerous as to assume a minor epidemic tendency. Dr. Mackintosh ascribed the origin of the complaints to errors in diet and excesses committed by a body of young men exposed to temptation, and reckless after a protracted voyage. Thirty-four cases of the choleraic disease alluded to occurred, tractable generally and readily amenable to treatment. Just before the detachment was moved to Bangalore, three cases of extraordinary severity, and exhibiting the most marked features of spasmodic cholera, all terminating fatally, occurred; but as the regiment was moved with all possible expedition from Arcot, the attack was arrested.

Having mentioned the chief disturbing and exceptional causes of mortality during the year, which otherwise would have been marked by statistics very favourable to the health of this Presidency, I may remark that, even with the decrement from cholera, the ratio of sickness and of death must be regarded as satisfactory, being well within the average limits of the last few years. I should have recorded, when describing the epidemic of Thayetmyo, a tribute of respect to the memory and humane labours of the late Surgeon Sparrow, 3rd Battalion, 60th Rifles, who, contracting the disease during his efforts to combat its effects on his charge, fell himself a victim to its virulence, dying almost in the execution of his duty. E. Balfour, Esq., Madras Army, the Deputy Inspector-General of Hospitals in Burmah, writes thus:—"It will I know afford you the highest satisfaction to be informed that Brigadiers Roe and Briggs have reported in the highest terms of the unwearied labours of the late Dr. Sparrow, and Assistant-Surgeons McTavish and Griffith, and the reports have been sent through the Division to his Excellency the Commander-in-Chief." I have therefore, in lamenting the loss to the service of the late Surgeon Sparrow, a melancholy pleasure in recording facts so honourable to his fame, and conceiving that it is my duty to bring to notice the acts of any Medical Officer under my superintendence when specially distinguished, I hope, under the circumstances connected with the demise of the Medical Officer specially referred to, I may be pardoned for making more than a passing allusion to his fate in this place.

Having considered the question of cholera occurring epidemically among the troops in one of our cantonments, I would now merely allude to the difficulty of avoiding those influences which, more or less along the roads and great lines of thoroughfare in this Presidency, render soldiers, native as well as European, more than usually predisposed to attack, with instances of occurrence during the year, particularly in reference to the last-mentioned body. I believe the instances are rare in which cholera does not appear either in a modified or severe form under such circumstances, and it has always been a subject of congratulation at the termination of a march when, by luck or careful sanitation, a detachment has succeeded in eluding a visitation. The means therefore indicated for avoidance or diminution of exposure are, 1st, To suspend the march of troops through infected districts till villages and infected points along the line of road are reported safe. 2nd, To change the route if possible. 3rd, To convey troops as rapidly as circumstances will admit from station to station; in fact, by means of the railway and ordinary transit conveyances so as to insure by a maximum dispatch the reduction of susceptibility to a minimum. It is well known that the emanations, both exhalent and secretive, and other collective pollutions evolved from the persons of large congregations of human beings in India, conduce to outbreaks of cholera, and, as in Madras as well as sister Presidencies, we have our fairs and sacred places resorted to by thousands of devotees, wherein, under the favouring conditions adverted to, the choleraic germ is incubated; so have we when the pilgrims on their return homewards, radiating in every direction from a contaminated centre, the lethal products conveyed along our lines of road deposited in village and district, bazaar and encampments far and wide, rendering such routes unsafe for indefinite periods.

Among the instances of cholera occurring along the line of march, I may note the 69th Regiment, the disease having appeared in a detachment joining head-quarters Fort St. George, from Wellington, 14th February. The surgeon states: "Cholera made its appearance on the march shortly after arrival at Coimbatore, two cases proving fatal at that place, and two on arrival at Madras." It is to be assumed that many more men would have been seized had the detachment not been rapidly removed from the focus of infection at Coimbatore by means of the railway. Cholera also appeared in a draft of recruits for the 18th and 108th Regiments on the 27th December, *en route* from the railway terminus at Sholapore to Secunderabad, the peculiarities attending the partial outbreak being recorded in the following extract from Staff Assistant-Surgeon Macadam's report: "In all seven cases occurred, five of which, including a woman and two children, proved fatal." Dr. Macadam states: "The detachment was immediately moved, which resulted in the cessation of the outbreak; only the inmates of one tent were attacked, and it is believed the disease was developed by a meal of pig's flesh surreptitiously procured by the attacked from a neighbouring village, and indulged in freely by the occupants of that particular tent only,"—an evidence of the necessity of discretion in the selection of food stuff in India.

The Enthetic Class of Order 1, of which more than 20 per cent. of the total sickness for the year consisted, continues to be regarded with grave anxiety as a perpetually recurring cause of a vast number of men being constantly non-effective from the primary consequences of erotic irregularities, with the prospective effects of syphilization both directly and indirectly, influencing invaliding to a vast extent. In most cantonments a system of lock has of late years been established, but being only partial in its surveillance, that is to say as concerns the soldier and prostitution within military limits, as far as can be exercised with respect to the liberty of the subject, I do not consider much good has resulted. There is no law to compel the examination of suspected women, nor regulate the conditions under which they shall practice their avocation, either as refers to their own persons or the domiciles frequented by them, and till some very active state interference is instituted to arrest the spread of infection, we must rest content with the means at our disposal to mitigate individual contamination, and much loss to the service periodically recurring from this order of complaints.

Having narrated the most serious and untoward disturbing elements connected with the vital statistics of the European portion of the Command for the year, I shall now briefly sum up in relating what has been projected or carried into effect in the way of improvement in sanitary matters as connected with the extension and progress of barrack and hospital accommodation, bedding, food and raiment, means for ablution, latrines, &c.

1st. With reference to barracks and hospitals at Bangalore. New Barracks are in course of erection on the space of open and elevated ground known as the old racecourse. Under instructions from his Excellency the Commander-in-Chief, the writer, associated in Committee with Officiating Inspector-General of Hospitals Shaw, and Dr. Mackenzie, Deputy Inspector-General, Mysore Division, under the presidentship of the first named gentleman, selected a site for an hospital, in the vicinity of barracks, near enough for convenience sake, and affording a degree of isolation necessary for such a purpose, and which was approved of by his Excellency, calculated for the accommodation of 120 patients, and sufficient at 10 per cent. for the treatment of the sick of the regiment of Dragoons and Royal Artillery intended on completion of the work to occupy the lines in question. The pavilion system was suggested for this purpose, each block to form a distinct and separate hospital, consisting of two lower and two upper wards, and each ward to contain 16 beds. The necessity of an adequate proportion of small wards for the treatment of special cases, with ample accessory buildings, including latrines, urinals, bathing and ablutionary means, was not lost sight of, together with quarters for a resident medical officer and subordinates. In fact, a most careful consideration to every requisite sanitary and special adaptation for such an establishment was given by the Committee, who based their recommendations on the report of the Commissioners for Improving the Sanitary Condition of Barracks and Hospitals, with such minor differences in detail as position and climate indicated. The report (a copy of which was forwarded for the information of the Director-General), was approved of by his Excellency the Commander-in-Chief, and subsequently generally by his Excellency the Governor of Madras and Council, and the papers transferred to the Department of Public Works, in view to plans and estimates being speedily prepared. The urgency for expedition in the construction of this building is evident in order that it may be fit for occupation coincidently with the barracks now progressing towards completion. The hospital accommodation in general at this very fine and healthy station is most defective, another reason for forwarding the work in question without delay.

It was brought to notice in the report that when the European Infantry regiment will move (as projected) into the barracks now occupied by the European Cavalry Corps, there will be a decided want of accommodation for its sick in the present Dragoon Hospital, a structure the Committee consider limited in space, badly arranged, unfit and deficient in every respect for the sick of a battalion of infantry. As additional hospital accommodation for the infantry regiment will therefore be urgently required when the projected transfer of lines is carried into effect, the questions as regards site and general plans should speedily be decided. Situation is the chief difficulty, there being no very eligible position in the vicinity of the present Cavalry Barracks obtainable unless on the public parade or private property in the neighbourhood. The expediency, therefore, of adding as much accommodation as might be wanted on the race-course by means of extra blocks in architectural relation to the building already decided on was considered. Objections were raised, however, to the agglomeration of anything like a general hospital on the racecourse, and also with reference to distance from the old Cavalry Barracks. Both I consider over estimated; for with the fine open site on which the new combined Cavalry and Artillery Hospital will be built, the addition referred to on sanitary grounds would be a source of no evil, and that distance is not objectionable, it may be mentioned that for a long time the sick of a detachment of the 66th Foot, now stationed on the race-course, have been conveyed a further distance to the Regimental Hospital, and I have never heard with bad results.

I would, before concluding my notice of the public work connected with hospital and barrack accommodation at Bangalore, suggest as to the future disposal of the old infantry barracks when they shall be vacated, on the completion of the new cantonment on the race-course. I have heard it casually mentioned that they may probably be utilized for the Commissariat or other public departmental uses. It is true that the barracks in question are antiquated, and not constructed in accordance with modern views for the accommodation of a large body of men, but as they are not unhealthy, I think it would be more advisable to retain them as barracks. One reason being in the event of sudden emergency, on political or sanitary reasons, requiring that any extraordinary number of troops should be quartered at Bangalore. I am, however, induced to recommend their maintenance on other grounds as well. The connection of Madras and Bangalore by railway is being effected, and from being a troublesome and sometimes a dangerous journey, on account of cholera more or less prevalent along the line of road, almost complete security may henceforth be looked for by rapidity of communication. I would, therefore, point out for consideration the expediency of ultimately removing the establishment connected with the Poonamallee Depôt to Bangalore, as affording a better climate in general for the great mass of invalids requiring change, and particularly in reference to the cases for final discharge, or necessitating removal to England. When the railway can be made use of, practically the invalids would be almost as near the point of embarkation as Poonamallee, and as the hour of arrival of trains can be depended on, by simultaneous and pre-arranged action between the authorities at both ends of the line, the invalids could be at once conveyed on board ship on arrival at Madras. There may be no radical fault to find with the climate of Poonamallee, further than what is natural to position; but no comparison can be instituted between exposure to the effects of high temperature on constitutions debilitated by disease at a station in the vicinity of Madras, and the semi-European climate of Bangalore, salubrious as it is also from elevation. Another advantage to be derived, and one I, from my office, consider of great importance, is that the establishment will be always (periods when on tour excepted), under the supervision and personal surveillance of the Principal Medical Officer, British Troops, while the convenience to be afforded for assembling Boards of Medical Officers invariably under his presidentship, when the members can always be two surgeons of British regiments, is too obvious to be disputed. I find the accommodation afforded by the old infantry barracks at Bangalore to be sufficent for 1535 men, with patcherries for 61 families, admitting of an approximation of space for the men to 731 feet cubic, and 60 superficial per man, and with a little improvement in ventilation and hospital accommodation, they might be most usefully adopted as the general invaliding depôt of the Presidency. Another advantage attending the transfer would be the conservation of the barracks at Poonamallee for the accommodation of drafts or any sudden influx of troops in the Presidency, as embarrassment from the difficulty of having to house unusually large arrivals of troops are not unlikely to arise. As on the completion of the new lines at Bangalore, the utilization of the old infantry barracks may probably become a question, I hope the proposition I have in my humble judgment made to turn them to a useful and good purpose may neither be deemed premature or out of place, and that my hint may at all events merit enquiry and consideration. It may be urged that many of the cases sent to Poonamallee are for the benefit of change to a closer neighbourhood to the sea. In reply to that I would say that a section of the Garrison Hospital, Madras, has been not long since reserved for 70 invalids, whose conditions render such a change necessary, and that branch could easily still be maintained. I cannot regard Poonamallee as a sanatarium, it appearing to me to be useful only for getting together invalids for final disposal by boards, while by a change to Bangalore both *desiderata* can be obtained, for to a good climate over 3,000 feet above the sea level may well be conceded the attributes of a sanatarium.

While noticing the public works of the year as connected with building alterations and improvements in barracks and hospitals, the extension of accommodation in the General and Garrison Hospital, Madras, and progress of the new quarters for the families of the troops forming the garrison of Fort St. George alone demand especial notice. It having been determined upon by Government instead of a separate hospital for the sick of the regiment at Madras, that as heretofore a portion of the General Hospital now in progress of considerable increase and improvement, should continue to be apportioned for that purpose. Accordingly a Committee nearly similarly constituted as in the Bangalore instance was appointed by the Commander-in-Chief to report on the portion and allotment to be assigned to the regiment, as well as for the accommodation of men coming from stations more or less distant in the interior, and whose state of health render change to the sea air desirable. The writer recorded his dissent from the project of augmenting the old Hospital for the purpose of accommodating the sick of the regiment, conceiving on sanitary grounds connected with position, and other reasons involving military hospital discipline, and to avoid the evils likely to attend the congregation in one vast building of the heterogeneous elements composing the inmates of a General Hospital in such a place as Madras, that the sick of the European regiment should be separately provided for. It having been determined, however, that no change in regard to locality of the Regimental Hospital could take place, it being destined to form a unit of the general building; it only remained for the Committee to allot ward space for the sick troops according to the most approved principles of measurement, ventilation, and lighting, with suitable requirements for administration, means for ablution, and other requisite accessory purposes. The Committee suggested that the entire blocks to be situated to the east should when completed be set aside for the sick of the European regiment, and it was calculated that 150 could be accommodated in the upper story, irrespective of the old wards on the ground floor, allowing to each bed an approximation of 1,900 cubic, and 115 feet superficial space. The ground floor will ultimately afford means for the surgeries and other administrative offices. It is intended as a rule that the sick shall be treated above, but as the perflation of the lower wards is by no means deficient, good ward space will be reserved for admission and treatment of cases of a contagious nature, and which it will be advisable to segregate with others requiring quiet, from the men above.

Much can be done to improve the area or compound in which this hospital is situated, and no building not absolutely required should occupy a portion of the space. The ground should be properly laid out as an ornamental garden, and the growth of grass and flowers encouraged for the double purpose of utilizing and rendering innocuous the organic products with which for obvious reasons the soil must abound, as well as to furnish an object so pleasing to the eye and conducive to convalescence in sickness. While objecting for the reasons I have specified to the position of this hospital, as well as its magnitude and composition of its inmates, for military hospital purposes, I admit that a very liberal allotment of space has been acceded for a regiment, and I may mention that the east wing was selected as affording the most free and direct exposure to the sanative influences of the prevailing sea breeze. Until the east wing is fit for occupation, the regiment will occupy the upper portion of the corresponding western extremity of the building.

Clothing.—No alterations appear to have lately been introduced in this respect. In general the clothing is very suitable, the variety afforded by the introduction of the light serge tunic being ample to meet any change of temperature. The substitution of a softer and lighter texture for trowsers in place of the heavy material that garment is made of, and fit only for a cold climate, would, with the serge tunic, complete the requirements for external clothing. The head-dress, though affording an excellent protection from the sun, is in material, I consider, susceptible of great improvement. A light felt helmet sufficiently thick, or one made up of any other substance non-absorbent of heat, should be introduced. Every soldier has his cholera belt, but the introduction of flannel underclothing as a portion of kit in India is highly essential.

Bedding.—Much improvement is gradually being carried into effect as regards hospital bedding by the introduction of coir mattresses, iron cots, and English blankets. The Commander-in-Chief is very anxious that improvements in this respect should be extended to the troops in barracks also. There are so many reasons for amelioration in this respect, and as I have entered fully into the merits of radical alterations, I shall better express my views by quoting a report called for by his Excellency on the subject.

Extract from a Letter addressed to the Quartermaster-General, dated September 21, 1863.

Para. 3.—"The bedding supplied by regulation consists, I believe, of a cotton quilt and pillow, issued annually, a sheet and cumbly, or country blanket. This quilt is very thin, and not at all adapted for a mattress, is liable to become matted by pressure, while the facility with which it absorbs the organic products of perspiration, with the liability to subsequent exhalation in a tainted and decomposed state, renders it objectionable for the purpose intended. One very observant Medical Officer has positively maintained this to be the case, and I have lately heard statements confirmatory of the same from men at barrack inspections. In some instances the soldier is permitted to retain a quilt after it has served its time, receiving compensation for new bedding if the old is in tolerable repair; in other cases an accumulation of several quilts has been permitted, I infer for the purpose of affording a soft bed. This I consider on sanitary grounds objectionable, for as each quilt in succession becomes saturated with decomposing animal matter, the effects of the volatilization and effluvia evolved from a multiplicity of such articles, particularly in damp weather, in a barrack room, may be readily inferred."

Para. 4.—"I do not consider the cotton quilt susceptible of being washed, under which condition, together with the present enhanced value of the staple, I consider it an expensive article."

Para. 5.—"I would, therefore, as a substitute for the cotton quilt, propose a coir mattress, such for instance as is used in the hospital of the 1st Dragoon Guards, Bangalore. It is a substance admirably adapted for bedding, possessing in a great degree the specialities of horsehair, which it is rapidly superseding on account of its cheapness, even in England. We are in the country which produces it, and where it can be obtained at a moderate rate. The fibre can be taken out and washed as well as its ticking case, and a single mattress will last easily five years, so I am informed."

Para. 6.—"The blankets should be English, and taken by the men when marching. Of course coir mattresses from bulk could not be used under such circumstances, and a question is suggested as to the advisability of retaining the quilts for such occasions. The quilt for a tent bed with a good blanket on a foundation of straw over the ground, would be more portable and convenient during the occasional periods when troops are moving from station to station, or in the field."

Kitchen Ranges.—Considerable progress has been made towards improvements indicated in this respect with reference to the disadvantages attending the old method of preparing the soldiers' food, still chiefly carried out by means of the native chulas or fire-places, and consequently attended by much waste of fuel and inefficiency in cooking. Dr. Duff's range has found favour, and when the experiments in progress are satisfactorily reduced, it is the desire of his Excellency the Commander-in-Chief that the stoves and ranges invented by the gentleman named, may with all expedition be introduced in all barracks and hospitals of European troops throughout the Command.

There is no doubt of the importance in a sanitary point of view of making the most of the soldiers' ration by every possible variety in its preparation, as well as to conserve those elements so essential to health, and usually dissipated by the destructive conversion the meat is subjected to in cooking under the existing system. The sooner then the salutary change is carried into effect the better.

Rations.—Regarding rations I have received no special reports adverse to either the quantity or average quality of the soldiers' food; but in adverting to the reports of the several Medical Officers, I fail to discover that the soldier in India is so overfed as has been alleged by an eminent writer, whose representations on the subject of the soldiers' welfare and health are justly received with respect; or that to overgorging from his ration can in any degree be attributed a special proclivity to the peculiar classes of disease he is so obviously subjected to in India.

It cannot be contended, with the waste of tissue and debility induced by climatic influences, that a pound of animal food, after undergoing reduction of its nutritive elements by the process of cooking, leaves a very great residue for the production of the evils alluded to. This will also appear to those acquainted with the deficiency in nutritious qualities of the meat of animals slaughtered in this country, as compared with animal food in England, so obvious as to require no further remark.

It would be attended with great benefit if an adequate supply of potatoes could be kept up at all stations throughout the year; but for obvious reasons at Secunderabad, Bellary, and Kamptee, and in British Burmah, there is a difficulty to surmount in this respect. At Bangalore and the hills the case is different, a continuous supply being obtainable. To remedy the deficiency soldiers' gardens should be largely encouraged for the cultivation of all proper vegetables indigenous to their respective stations, as well as such of home origin as the climate will admit of growing. In Burmah during the hot weather preserved potatoes were issued at the rate of a fourth of a pound per man per diem, and much approved of. Good preserved potatoes should be issued at other stations under similar conditions. I think it might be so arranged by the Commissariat, now that much difficulty as regards transit is obviated by railway ramifications, to keep up a more regular supply of this useful tuber than hitherto, the capabilities of growing potatoes at the Neilgherries and at Bangalore being almost unlimited, and an adequate demand is only wanted to stimulate cultivation.

Regarding the progress of those moral and physical recreations, considered everywhere so conducive to health and the enjoyment of life, and which are more particularly indicated for soldiers serving in India, where escape from the consequences of *ennui* and monotony is from climatal causes so difficult, I have little information to afford. Whatever I observed throughout my tour of inspection placed at the disposal of the soldier in the way of amusement and relief from the ever-recurring sameness of morning and evening military duty and routine of parades, alternating as they do with his lethargic confinement to barracks during the most of the day for a great part of the year, was chiefly due to the soldier himself or to the liberality of his officers. It is true Government has constructed ball courts and skittle grounds, but I conceive works of greater magnitude and importance than these are required. I need not point out the value of the gymnasium as a means of improving the physique and health of the soldier by invigorating the nervous system, and imparting that tone to the muscles so essential to soldierly bearing, and what is technically described as "setting up," than which no method is so effective as that acquired by the trapeze and other athletic exercises as gone through during a course in the gymnasium at our principal military stations at home. The importance of such institutions is acknowledged by their universal adoption at the camps and chief stations of all European armies; and the necessity of developing the muscular system and teaching soldiers to swim is considered so important an element of his military training as to be secondary only to that which conveys to him the use of his arms. It is as an element of health that I chiefly recommend the gymnasium, and as it is my duty to bring to notice such points as I deem conducive to the efficiency of the soldier, I can suggest none better than one which, while it tends by natural and wholesome exercise to the elimination of surplus products of nutrition inimical to health, has the effect of utilizing what are retained for the supply of tissues in the highest possible state of organization and bodily vigour, conduces thereby to the maximum endurance and military efficiency. I have myself witnessed the good effects of the training gone through in the gymnasium at Aldershot, when Surgeon of the 64th Regiment, on its return from India in 1861. Improvement in the carriage and soldierly bearing of the men generally was most satisfactory, while its tendency to strengthen the constitutions of men of inferior development was very marked when moderately exercised. In fact I know of nothing so remediable of defects in physical development in young soldiers as a steadily carried out course in the gymnasium, nor a system generally more conducive to the formation of a perfect soldier; in fact, I cannot understand how a man can sustain the special demands on his physique as an infantry soldier, particularly for light and fast movements under arms, without such training.

Regarding the means of moral instruction, I found in most regiments a reading-room and library, from which men of enquiring minds and intelligence can derive much moral and mental amusement and culture. The most complete establishment of the kind being the Soldier's Institute of Trimulgherry, which combined every desideratum, including a theatre, reading-room, library, and coffee-room, and which affords a satisfactory example for the advisability of extending analogous institutions to all large stations throughout the Command.

The want of stables for the horses of the Cavalry and Artillery struck me as an evil requiring immediate remedy. If it is scarcely my duty to point out the destructive effects of want of shelter as regards the loss this ill-advised exposure of such valuable property entails on the state, it surely becomes my duty to plead for a mitigation regarding its insanative influences on the lives of soldiers. I am told the effective service of horses belonging to Government exposed in this way is limited to five years, while horses the property of private individuals who use stables last probably twice as long. It has also been mentioned that Cavalry and Artillery horses are exposed to sun and weather in view to hardening them. Let Veterinarians decide the value of such a fallacy, and in what degree hepatic and other congestions, rheumatism, and a whole host of analogous equine maladies result from this system of *hardening*. I would only ask if such are the effects on the health of horses, are the men who after a hard morning parade or field day have to groom the animals at their pickets, proof in their own persons against solar influence with reference to corresponding congestions, or the more direct effects of the vertical sun on the brain and nervous system in the production of the condition known as insolation? I have not as yet collected the means of proving in what degree that exposure is provocative of such consequences, but that they are so does not, I conceive, require much evidence to substantiate.

My immediate predecessor in office has brought this question forward in successive reports, and the logical reasoning brought to bear by him on the subject has exhausted any additional hygienic arguments I could urge for the necessity of shelter for horses, with reference to influences affecting the men. I consider it my duty to revive the question in the hope of its attracting the attention it merits.

EXTRACTS FROM THE SANITARY REPORT OF THE 2ND AND 4TH BATTERIES 17TH BRIGADE ROYAL ARTILLERY, STATIONED AT SINGAPORE, FROM THE 15TH SEPTEMBER TO THE END OF THE YEAR 1863.

By Assistant-Surgeon A. FERGUSSON, M.D.

THE barracks of Fort Canning, where the Royal Artillery (included in this report) are quartered, occupies an elevated and otherwise eligible situation in close proximity to the town of Singapore, which is situated on the south-eastern border of the island of the same name, in latitude 1° 17" north, and longitude 103° 51′ 18" east.

The island is situated at the southern extremity of the Malay Peninsula, and only separated from it by a small arm of the sea, a little more than a quarter of a mile at its narrowest point. It is elongated in form, about 27 miles in its greatest length, from east to west; 15½ miles in its greatest breadth, from north to south, and contains an estimated area of 270 square miles.

From its position, so near the equator, the variations and changes of seasons and climate are, as might naturally be expected, extremely limited. It is subject to the influence of two monsoons, viz., the north-east and south-west; the former is said to commence about the beginning or middle of October, and to continue until the end of March or beginning of April, and the latter prevails during the other months of the year. During the prevalence of the north-east monsoon, the quantity of rain which falls is greater than that of the south-west, it blows with more regularity, and the temperature is generally a degree or two cooler. For these and similar reasons, the north-east monsoon is considered the healthier of the two. Rain falls on an average about half the number of days in the year, most copious generally in December and January, which circumstance gives them the reputation of being two of the coolest months in the year. The nights are nearly always sufficiently cool to allow of good refreshing sleep—a hot wind from the sea, called by the natives Jawar Wind, is said to be common during the south-west monsoon, the effects of which are supposed to be peculiarly unhealthful to invalids, and those of a weakly constitution. This, however, may be considered more imaginary than real, for the statistics of disease certainly do not show any very marked periodical difference in the proportion between health and disease among the population, either civil or military, European or native, at any time of the year. The climate of the town and of the island generally, notwithstanding its low-lying, intertropical position and atmosphere, usually charged with moisture of high temperature, unchangeable, and surrounded as it is with jungles of rank vegetation, fresh and salt-water swamps, and other conditions favourable to the production of miasma and disease, is remarkable for its salubrity and adaptation to the wants of the European constitution.

The natives of India do not appear to enjoy quite the same immunity from disease as the European population, a circumstance probably dependent upon causes of an accidental nature otherwise than that of climate.

The thermometer varies very little throughout the year, the average for 1863 has been about 80½° Fah., and the greatest range seldom more than 19° Fah. The rain-fall during the year has been 86·44 inches. There has been little sickness in the corps since arrival on the station, and those cases of sickness which have occurred have been of a very simple nature.

Physical Geography.—The surface of the country in the vicinity of, and that of the island of Singapore generally, is undulating and of a very uneven description, consisting chiefly of a succession of alternate hill and vale, permeated by numerous small rivers, and fresh and salt-water swamps; the coast is indented by a number of small bays and salt-water creeks, into which the rivers empty themselves.

The height of the hills is inconsiderable, the highest (near the centre of the island) is said to be between 500 and 600 feet above the sea level, the average is between 90 and 100 feet; some of them are slightly pyramidal in form, others, and the majority, are elongated, forming in some parts systems of ramifications, at other parts running in lines parallel with the length of the island from east to west.

Between the hill ranges run narrow valleys, chiefly of marine formation, made up (in lower strata) of various kinds of sand, gravel, ferruginous clays, and mud silt of a coal-black appearance. Marine shells and remains of infusorial organisms are also occasionally found embedded in the clay. The upper strata are for the most part composed of the miscellaneous *débris* of animal and vegetable substances, decomposed granite, siliceous and aluminous matter and soil carried down by the rains from the hills. They are permeated by small rivers or streams, and generally terminate in salt-water creeks. The largest of these valleys is (that on which the town is situated) at the south-east extremity of the island. This contains an area of about 20,000 square acres.

In geological formation the island is composed chiefly of granite and other igneous rocks; into those of granite formation hornblende and felspar enter largely, quartz and mica proportionately rare, granite of the common type, and syenites are found in greatest quantities on the north side of the island; soft shell, ferruginous rocks, sandstone conglomerates, and other sedimentary rocks also enter into its composition. Pyrites is found only in small quantities; coral formations surround the island.

The contiguous group of small desert isles which surround Singapore, within a radius of 10 or 12 miles, is supposed to be of similar origin and geological formation. The soil is very variable in quality, but generally speaking not fertile, at least by no means to that extent which might have been expected from the luxuriance and excess of its vegetation. Trees, plants, &c., indigenous to the soil, thrive luxuriantly (attributable probably to the great moisture and general condition of the atmosphere more than to the properties of the soil), while those cultivated, unless that process is carried out to its highest extent, often become stunted and unproductive. With the exception of rice, none of the cereals are cultivated, and this only to a very small extent; for the supply of this very necessary article of food the inhabitants are almost entirely dependent on other countries. The cocoa-nut, sugar-cane, gambier or terra-japonica, sago palm, and arrowroot plants are cultivated to a considerable extent in different parts of the island.

The climate seems well adapted for the production of spices, such as cloves, nutmeg, cinnamon, black pepper, &c., but they require to be highly manured. European vegetables generally do not grow well, when cultivated at all they are only so to a trifling extent.

The variety of tropical fruits, especially those containing the farinaceous materials of food, is large and abundant. Of those peculiar to the Archipelago, the mangosteen, duku, and dorian (for the richness and delicacy of their flavour), are the most notable. Such plants (used in European medicine) as castor oil, croton oil, stramonium, menthæ, citrons, and a few others, are grown but in small quantities only.

The surface of the island in the interior, and those parts which have not been cleared of their primitive vegetation are covered with forest jungle and dense underbrushwood, in a state of perpetual verdure and rank luxuriance.

Medical Topography.—Those formidable varieties of fever, dysentery, and other diseases of a severe type common to tropical climates, are not indigenous to, or are rarely met with as such in the island. The most of those cases of miasmatic disease, such as intermittent, remittent fevers, and acute cases of dysentery which do occur here, are generally found to have been contracted in other countries. Fevers (common continued), hepatitis, rheumatism, diarrhœa, bronchitis, phthisis, influenza of a very mild type, asthma, various kinds of intestinal worms, ulcers, and other diseases of the skin, are among the most common forms of disease met with. Small-pox, in epidemic form, occasionally breaks out. Cholera sometimes visits the island. Lepra is common among the native community, especially the Chinese. In relaxed and weak constitutions ulcers have a tendency to slough, and chancres frequently assume a phagedænic character. The climate is inimical to those suffering from chronic disease of the lungs, such as asthma in certain forms, bronchitis, and phthisis pulmonalis in its second stages.

A tedious convalescence (as might be anticipated in such a relaxing climate) is a common feature in those recovering from acute diseases.

Barracks—Fort Canning.—Both batteries embarked on board the same ship at Madras for Singapore, on 2nd of September, 1863, and arrived at Singapore on the 15th of the same month, after a passage of 13 days. The barracks are situated within the Fort, and consist of a large block of buildings, 510 feet long by 74 broad. They run in a direction from south-east to north-west, describing a slight curve in their course, the convexity of which looks towards the south-west.

They are built with good brick and lime, and roofed with tiles. The floor is raised between 2¾ and 3 feet from the ground, and is composed of large square bricks, pointed with chunam.

The hill on which the barracks and fort are built is somewhat pyramidal in shape, truncated at the top, and rises abruptly from the valley of Singapore to a height of about 150 feet above the level of the sea (to the nearest point of which from the bottom of the hill the distance is not more than 400 yards), the position commands an excellent view of the whole of the town beneath, the harbour with its shipping, and the surrounding country for a considerable distance. It is a healthy position.

The rooms are spacious and well-ventilated. Walls 16½ feet high, from floor to crown of roof 32 feet; from floor to top of side pillars, 24 feet. There are 22 doors, 10 feet by 5; windows, 48 in number, 7 feet by 5. There are also two wall ventilators above each door and window, 1 foot high by 3 in breadth, they are at a distance of about 2 feet above each window and door. Besides the numerous large door-ways and windows, the process of ventilation is still further carried on by the system of over-lapping roof ventilators. A large broad verandah surrounds the building. The monthly average number of men occupying the barracks was 148; the cubic space to each man was 2,852 feet.

The quarters for the married men occupy each end of the building. Each quarter consists of a single room; but moveable screens are about to be supplied for the purpose of dividing them into two compartments. These rooms, although not relatively so commodious and well ventilated as the barracks for single men, still are very comfortable ones, and well suited for their purpose. A number of small rooms have recently been partitioned off from the barrack-room with planking, as temporary quarters for certain of the married men belonging to No. 2 Battery, there being an excess (to regulated number) of married people in this battery for whom no permanent quarters are provided.

The general construction of the whole is good and conducive to health, and the means of ventilation most efficient. As the thermometer seldom falls below 70° Fah., artificial heat for warming the rooms is unnecessary. The walls and ceilings of barrack-rooms were lime-washed in the end of April last year, and preparations are being made for their undergoing a similar process now.

The accessories of ablution and bath accommodation have been sufficient, and regularly used by the men. Near to the bottom of the hill on which the Fort is situated, and facing the north, a good large swimming bath has been constructed for their use, to which is conveniently attached a little wooden house, where the men can comfortably dress and dry themselves after bathing. They use this, but not to the extent they ought, chiefly on account of the usually muddy state of the water. This state of things is produced by the clay, sand, and other particles of matter from the embankment and neighbouring high ground being carried thither after every shower of rain. When grasses and the natural verdure of the place have covered these slopes, this defect will be remedied, and I have no doubt but that it will become a favourite resort for the men during leisure hours in fine weather. Bathing parades have not as yet been instituted for the above reasons. When the bath is in proper order this salutary exercise and amusement will be duly attended to.

The latrines and urinals are kept clean. All ordure and other refuse matter is removed twice a day, or oftener if necessary. The utensils (which are composed of earthenware) are washed out with lime water, and the latrine floors sprinkled with quick lime at least once a-day.

On the recommendation of Deputy Inspector-General of Hospitals, E. Balfour, coal tar and wood ashes are about to be used for the purpose of deodorization, instead of the lime. Water is principally supplied from a well 150 feet in depth immediately at the rear of the barracks by means of a sucking and lifting pump, worked by coolies. With four men at work between 400 and 500 gallons of water can be raised in an hour. It is of good quality, but owing to the supply of water in the well itself being limited (especially when three or four days pass without a fall of rain), a considerable quantity is required to be carted up daily from a well at the bottom of the hill. There is another well within the Fort at the north end of the hospital, in which water in large quantity has recently been found after having sunk it to a depth of over 200 feet. It contains now over 65 feet of water, and is to be supplied with a pump similar to the one behind the barracks. When this is completed the water supply within the Fort will be ample for every purpose.

The sanitary arrangements in the barracks have generally been properly attended to. There are no local causes of disease that I have been able to discover.

Diet.—The composition of the rations since arrival at this station has been as follows. To each man is issued without variation:—

	Bread.	Beef.	Salt pork.	Potatoes.	Sweet potatoes.	Firewood.	Rice.	Tea.	Coffee.	Salt.	Sugar.	Peas.
	lbs.	lbs.	lbs.	lbs.	*lbs.	lbs.	oz.	oz.	oz.	oz.	oz.	oz.
Monday	1	1	—	—	1	3	4	—	$1\frac{3}{7}$	1	$2\frac{1}{3}$	—
Tuesday	1	1	—	—	1	3	4	$\frac{5}{7}$	—	1	$2\frac{1}{3}$	—
Wednesday........	1	1	—	—	1	3	4	—	$1\frac{3}{7}$	1	$2\frac{1}{3}$	—
Thursday	1	—	1	—	1	3	4	$\frac{5}{7}$	—	1	$2\frac{1}{3}$	4
Friday............	1	1	—	—	1	3	4	—	$1\frac{3}{7}$	1	$2\frac{1}{3}$	—
Saturday..........	1	1	—	—	1	3	4	$\frac{5}{7}$	—	1	$2\frac{1}{3}$	—
Sunday	1	—	1	1	—	3	4	—	$1\frac{3}{7}$	1	$2\frac{1}{3}$	4

With regard to the boiling and roasting of their rations, no compulsion is exercised in the matter, it is left to the men's own discretion and tastes. The majority of them prefer their meat boiled, but for breakfast on the days when pork is issued (Thursdays and Sundays) they usually have a certain portion of it fried; but the great objection to this is, as they say, that before it can be properly cooked in this way (on account of the large proportion of fat of which it is generally made up) it has dwindled down so much in bulk that there is hardly anything of it left for them to eat.†

The men have been very healthy since arrival here, and their diet must, therefore, have been nutritive and sufficiently varied to preserve health; but at the same time I consider a little more variety in the animal part of the food would be highly advisable and advantageous, as the greater portion of even the best pork is usually pure fat, and fatty substances as articles of food in a tropical climate, when useful at all, are only so in the smallest quantities. I have advised, therefore, the substitution of one pound of fresh mutton instead of the salt pork at least once a week, thus adding both to the nutritive qualities and variation of the rations. In this both the Commanding Officer and Brigadier Commanding the troops entirely concurred, but the adoption of the change has been frustrated by the local authorities on the ground of some little extra expense likely to be incurred were it carried out. It is to be hoped, however, that this objection will be got over, especially if, as I believe, it can be shown that by proper management the difference in the cost between fresh mutton and salt pork will only be trifling.

Beer, porter, and arrack are the drinks most commonly used. That obtained in the canteen is generally of very fair quality, but the liquors common in the bazaar, such as absinth, "shum shu," arrack, brandy, &c., are as usual highly adulterated.

A skittle alley and gymnasium have been erected for the use of the men, in which games they exercise and amuse themselves as feelings dictate. They occasionally play at foot-ball, the game of quoits, and rowing in the harbour. They have been provided with one boat, and efforts are being made to obtain for them another—one for each battery.

Gardening (kitchen and floral) is practised by those who have a taste for things of that kind.

A library and reading-room exist, in which there is a very fair supply of instructive and amusing books, with a bi-monthly supply of Home and Indian papers, periodicals, &c. Games of backgammon, draughts, &c., are practised.

The bedding has been kept clean and as dry and wholesome as practicable under existing circumstances, but in an atmosphere generally loaded with moisture, as this is, with no artificial means at disposal for the purposes of drying, it is often a thing almost impossible to keep bedding and articles of

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* Onions, when they can be obtained, as usually, supplied with the sweet potatoes.

† The arrangements for cooking are, on the whole, good; but if ovens (one to each battery) on the improved principle were supplied, these arrangements would be carried out more satisfactorily, as well as economically, the price of fuel being usually high at this station.

clothing free from damp. They are aired in accordance with regulation as opportunity admits.

Hospital, Fort Canning.—The hospital is very well ventilated, and otherwise in good condition. There is ample space in the wards for the average sick of a much larger body of men.

The condition of drainage, water-closets, latrines, &c., generally good. The drains (subsoil) of the fort are, as regards number, very large, but in many places they appear to be slightly defective as to size, in so far as they become occasionally choked up with sand and other matter after heavy falls of rain, an accident which could not so readily occur had they been made originally of larger capacity.

BENGAL PRESIDENCY.

GENERAL SANITARY REPORT ON THE WHITE TROOPS SERVING IN BENGAL IN 1863.

By Deputy Inspector-General GORDON, C.B.

IN the following general remarks it is proposed to adhere, as closely as possible to the order in which the printed instructions occur in the margin of the forms sent to be filled in by individual Medical Officers.

Hitherto, no regular system of making and recording meteorological observations at stations occupied by our troops in Bengal has been in force, neither have instruments been supplied for the purpose. This subject having attracted attention measures are now in progress of being matured with a view to having similar series of observations carried out in this country, to those made in the other foreign possessions.

The meteorological observations, appended to reports from some of the stations, have, it is to be feared, not always been taken with absolute care.* The instruments have not been of standard correctness, nor is it always clear that they were placed in the necessary position to indicate correctly the temperature of the atmosphere.

It is obvious that our troops, scattered as they are throughout the immense territory over which the Bengal Command extends, are subject to a very great variety of climates.

Thus, in Lower Bengal, they are exposed to the effects of a humid, hot climate, even during the driest period of the year, with an absence of strong breezes, as a rule, during the day, but with the occurrence in the evenings of somewhat cool ones from the south; here the rainy season is of somewhat long duration, and the annual amount of rainfall on an average of 70 inches; and the cold season, which may be considered to last about three months, is so mild that in mid-winter, exposure to the sun is not altogether free from personal inconvenience.

At these stations where such a climate prevails, dysentery and hepatatis especially during, and even after the cessation of the rains, are frequent. Intermittent fever and enlargement of the spleen prevail, the latter to a great extent among children. Ophthalmia would seem to be comparatively rare, and cholera, although always present among the natives, and occurring in isolated cases among the troops, does not seem of late years to have prevailed in the virulent form which characterized epidemics elsewhere.

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* Not published; found incorrect.

Further up the country, and extending to Central India, is the zone of hot winds. Here the temperature, during their prevalence, becomes very high, even in the shade. The atmosphere contains a very small amount of aqueous vapour, hence evaporation takes place rapidly, and thus tatties, wetted with water, are made use of at the doors and windows of the rooms for the purpose of rendering the interior cool. During the continuance of the period of hot winds, severe dust storms or whirlwinds occur, sometimes attended by thunder and lightning, sometimes not, but always for a brief period rendering agreeable a climate which, but for their occurrence, would be unbearable. As a rule, the hot winds lull during the night, sometimes they are interrupted for several days. In either case the temperature during their absence is oppressive and stifling; cases of what have been called "coup de soleil" become frequent, and physical energy is prostrated.

In some portions of the country as, for instance, the tract from Allahabad to Ferozepore, the recurrence of the rainy season is very regular, as a rule, and with its advent comes a relief to the sensations. Sometimes, however, as in 1861, the rains are delayed; as then happened, when they do occur, they fall in unusual quantity, and under such circumstances, cholera often breaks out, with the virulence which characterized the epidemic of that year.

Beyond the River Sutlej, however, the occurrence of periodical rains become irregular, as also the amount which falls, and these peculiarities increase towards Peshawur, where not only are the hot winds very irregular in their prevalence, but rain in some years does not fall till September, while during several months preceding, the atmosphere in the valley is still and stifling. Towards Scinde, on the other hand, the hot winds blow with great intensity, and so continuously that it is said tatties are in use during nine months in the year.

At Mooltan, it is stated, that a regular rainy season does not occur more than once in every four or five years, and that when it does, 17 inches of rain are considered an unusually large amount. This, for instance, was the case in 1858. It was so again in 1863, and on both these occasions, intermittent fever and scurvy occurred in an epidemic form. At these various places the temperature during the cold months is low; but it seems to have this effect, that persons who had, during the heat, suffered from intermittent fever or hepatitis are subject to severe attacks of these diseases during that period. As a rule the troops during the greatest heat are remarkably healthy, their principal disease being continued fever. During stagnation of the atmosphere heat apoplexy is of frequent occurrence, the greater number of attacks coming on at night.

Cholera has swept over a great extent of the country, whose climate is thus described, but the fact is noted, that the British troops at Mooltan have not yet been seized with it in an epidemic form.

Dysentery is present during the rainy season, but it would seem, that while in Lower Bengal the hœmorrhagic form of this disease prevails, here, in the zone under notice, the inflammatory is the most frequent; it must be obvious, therefore, that a system of treatment successful in the one, would be inapplicable to the other.

Along the southern aspect of the Himalayas, a series of so-called sanataria occupy the lower ranges of these mountains. As a rule, the summer heat is much less intense at these than in the plains—the hot winds are altogether absent. The rainy season is not only protracted in duration, but the rainfall large. In winter, however, the climate approaches that of the United Kingdom, and in some of them heavy falls of snow take place in January and February. The peculiarity of these is, that almost all new arrivals suffer more or less from attacks of diarrhœa, and it may be noticed that persons affected with organic disease proceeding to them from the plains, very seldom recover, and in many instances retrograde. Those, however, who go there in health, if they escape the prevailing diarrhœa, retain their good health. Such a variety of climates as is here enumerated, all more or less unnatural to a native of the British Isles, must have a serious effect upon health.

Throughout the extent of the plains of India there prevails what, to a soldier, is an unnatural degree of heat. In one part this is attended by unnatural moisture, and in another by unnatural dryness. In these circumstances there is much to explain the increased rate of sickness and mortality among our troops in India, as compared with the home and more temperate stations; nor must the fact be forgotten, that it is not alone among foreign troops, as ours are, that an increased death and sick rate prevails, but that the same amount happens with the lower animals. Thus English horses, cattle and dogs are less long lived, when brought to India than they are in their native climate, and it may be noted that a scientific traveller mentions the circumstance that Yaks do not live at a lower elevation than 7,000 feet. They are carried off by liver disease. (Hooker's Himalayah Journey, vol. i, page 204.) Great as is the difference between meteorology and climate of the different parts of Bengal, occupied by our troops, it can scarcely be considered so great as that which exists between their physical geography. So great is it indeed that more than the merest sketch regarding it cannot be given in a report such as this.

Some of the stations are situated in the Delta of the Ganges, as for instance Fort William, Barrackpore, Dum Dum, Chinsurah, and Berhampore; all these, with one exception, are on the bank of one of its mouths, namely the Hoogly; that exception being Dum Dum, and it is only about five miles inland from the river. Like all Deltas, the soil here is rich alluvium; water exists abundantly at a depth of a few feet from the surface, and dense forest vegetation extends all around, except where it has been cut down around cities and stations; numerous tanks have had to be excavated for receiving the surface drainage, as otherwise, during a considerable part of the year, the vicinity would remain submerged, and at Berhampore extensive embankments extend along the adjoining river, and thus the station, which is about a foot and a-half below high-water mark, is saved from being inundated.

The surface of the ground is throughout this great extent covered with vegetation, its vegetation and crops purely tropical in their nature.

Beyond this inland stretches an immense extent of plain, the division between which and that just described is formed by the low well-wooded range of Rajmahal Hills. From these to the River Soane, the general aspect of the country remains more or less similar to that of the tract to the eastward; but beyond that river, vegetation, and especially forest vegetation, diminishes. The soil becomes light in colour, more or less sandy, and impregnated with kunkar.

Still further inland barren tracts occur, their surface white with efflorescing salts, patches of plantation here and there, and occasional tracts of hard-looking brushwood of Acacia and Coral tree. Then again, travelling further still, ravines and creeks in the soil are met with in all directions. In the hot and in the cold seasons, the surface of the ground is bare, save in the vicinity of rivers and marshes, and these themselves become less frequent and smaller as we progress.

Then we reach the outskirts of a sandy desert, which stretches away down to Scinde, then again we reach the Punjaub, arid and bare, save near its fine rivers, the line of which, green with vegetation and forest, is easily traced. Proceeding north, the country becomes undulating, yet bare; at last, across the Jhelum rocks crop out, beds of streams, lined with round pebbles, intersect the country, and their water, clear and cold, runs along in their course from the mountains that now occur, within the distance of a few miles to the right. Then Peshawur is reached, more than half surrounded by hills as it is, and occupying a site which may at one time have been the bed of a lake.

On a plateau in the range of hills which bounds Bengal proper, lies the station of Hazareebaugh. Gwalior is for the most part rocky and bare, while close to Delhi is a low range of rock separating the city from a low-lying and malarious tract of land.

Then again some of the hill stations occupy sites having an elevation of 7,000 feet above sea level, as for instance Senchal; some of these are beautifully wooded, as that place and Murree, others are bare, as Landour, Subathoo, and Dugshai.

As already observed, each has its peculiar climate and distinctive disease Ophthalmia prevails to the greatest extent among the troops occupying stations in the upper provinces, where, during the dry season, the amount of dust is very great. Peshawur has its distinctive intermittent fever, the tendency to which continues among troops for a considerable time after they have left the valley. Delhi has its peculiar phagadenic ulcer, and Mooltan, both the Scinde boil and scurvy; while Cawnpore holds pre-eminence on account of the frequency of death there by heat apoplexy.

There is great variety in the description of barracks occupied by the troops; some are three stories high, such as the Dalhousie Barracks in Fort William; some two-storied, as those at Dum Dum, Chinsurah, and Berhampore. Others, and the greater number, are one-storied temporary buildings, the stations in which these occur being little better than standing camps. In the Punjaub, some large, narrow, high one-storied buildings were erected upon what was deemed a superior principle to any other in use. In Oude, buildings were erected each capable of accommodating half a company of men. In some of the Central Indian stations private houses had to be taken for the use of the troops. In Delhi the houses of native and public buildings had to be converted into barracks, and for a time the troops occupying the fort of Mooltan lived in domes.

As a rule, arrangements have been made so that the men might have ample cubic space in barracks, and for the most part were successful. So with superficial space. At some stations, however, sufficient accommodation for the men did not exist, and some degree of overcrowding was inevitable. Mooltan and Benares are instances. The greater number of the moves during the year were in course of ordinary relief; but those of several regiments took place in consequence of the occurrence of hostilities on the frontier towards Affghanistan, and an expedition having gone against the hostile tribes there. The usual number of men in each tent when proceeding on ordinary relief was 16, but in some instances there were only 12.

In most instances, where military necessity did not overrule every other consideration, the different barracks were placed on the most favourable site for sanitary purposes. In nearly all places where periodical winds prevail, and the barracks could be erected, so as to have the breeze, this arrangement has been adopted. At Mooltan and Peshawur, military necessities demand that the barracks should be in a particular position; and at the hill stations the construction and erection of particular buildings have to be modified, so as to suit the peculiarities of the site. A strange mistake, which has often been mentioned in periodical reports such as this, was made in the arrangement of the large barracks at Dinapore, they having their ends exposed to the prevailing wind, so that proper ventilation in these was impracticable.

Every endeavour seems to have been made to secure proper ventilation of those barrack-buildings that required improvements in this respect. The circumstance may, with propriety, be noted here, that the whole subject of barrack construction by the Sanitary Commissioners for Bengal, and recommendations in reference to it are about to be laid before Government; as therefore, the greater number of the barracks already existing in this part of India are of a temporary nature, and occupy sites that are, for various reasons, to be abandoned, it is hoped that those about to be built may, if in accordance with the plans suggested, meet every requirement of the troops in this climate.

The means of ventilation in the barracks vary much, not only in description, but in degree of efficiency. As a rule, these means consist of doors, windows, and roof and ridge openings; with one or two exceptions, however, as, for example, at Delhi and Mooltan, these are sufficient.* At Meerut the barraacks are in some instances so crowded together that free perflation is not practicable. And in some reports a remark occurs to the effect, that the outer edge of the roof projects so much, and is brought down so low, that the free entrance of air into the building is interfered with.

In the lower provinces warming is not required. At some stations in Oude Medical Officers record their opinion, that fires would be advantageous to the men during the cold months. In the upper provinces and at Mooltan fires were burnt during the winter season. In a few instances there were fire-places in the rooms, but in the majority the somewhat inconvenient plan was adopted of having them in the verandah. The fuel consists of firewood, generally in a green state, and much inconvenience is complained of, especially at hill stations, on account of the smoke which arises from it.

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* The Inspector-General, Dr. Beatson, observes—"Not so either at Dugshai or Subathoo, or in the old barracks at Kussowlie."

According to local Indian regulations, lime-washing the walls and ceilings of barrack-rooms is only sanctioned once during the year. At some of the stations this was adhered to; at others, however, they were limewashed twice during the same period, and in a few Medical Officers' reports they were as often as was deemed necessary treated in this manner.

As a rule the bath and ablution accommodation for the troops have been indifferent, notwithstanding that great improvements have been made in them during 1863. Particular defects are noted under particular stations; but it must be recorded, that since the sanitary administration of cantonments has attracted public attention, every endeavour is being made to provide requirements, which up till a recent period, Regimental Medical Officers vainly represented in their periodical reports. Still, comparatively little has been done in these respects to meet the wants of married families in barracks. There have, in some regiments been bathing parades; but those in which they have been held are comparatively few in number.

Together with the subject of improved barrack-accommodation, the subject of improved means of ablution is before the Sanitary Commission of Calcutta, and doubtless satisfactory arrangements in regard to it will in due time be made.

Up to the present time the cooking arrangements for the troops have been of the worst and most primitive description. The kitchens have been dark and ill-ventilated; there have been neither tables nor dressers. The black cooks have had nothing whereon to place the rations, except a mat or soiled cloth, placed upon a dirty floor. The plan adopted in cutting up the meat has been, for the native half divested of clothing, to sit upon his haunches on the floor close to the heap of meat; and, with the knife firmly grasped between his toes, to draw the meat against it, and thus divide the portion into small pieces, one after the other of which he cast into a dirty earthen vessel, which being placed upon some embers on the floor, sufficed for stewpan, kettle, and fryingpan.

The subject of cooking having come before the Commissariat Commission,* by it, various recommendations have been made, in view to give the soldier somewhat of the advantages in this respect enjoyed by him in our colonies and at home. While this summary is being written, the subject is being investigated by Committees assembled at stations under orders by the Commander-in-Chief in India, so that the time seems not far distant when soldiers in India shall have the advantage of meals prepared in proper vessels, in proper kitchens, by trained and efficient cooks.

During this year the dry system of conservancy has been in force at all the stations in this Presidency; at some, however, the effects of the former system of cesspools are still experienced; for instance, at Meean Meer the water obtained from near where cesspool privies formerly existed, is said to contain a considerable amount of organic matter.† The latrines and urinals are, as a rule, kept very clean; their contents removed in air-tight vessels, or those as nearly air-tight as are obtainable. At some stations, as for instance, Peshawur, Morar, and Mooltan, natural difficulties exist against complete drainage. At other stations, as for instance, Hazareebaugh, the main drain is so neglected as to be itself a nuisance. At others, such as Umballah, they are so liable to be choked up with mud during the rainy season as to be of very little use; but for the most part, such surface drains as exist, effect the purposes for which they were made. It must be borne in mind, however, that on account of the physical character of the country, and the actual position of many military stations in Bengal, drainage, as that expression is understood in England, is not only impracticable, but utterly unadapted to them.

The sources of water supply for the troops vary somewhat in different portions of the Command; thus, in Lower Bengal, it is obtained partly from tanks, and is everywhere abundant. Throughout the greater part of the plains, it is obtained almost entirely from wells. In some stations its supply is copious throughout the year; at others, however, as for example, Hazareebaugh, Umballah, and some of the Central Indian ones, it is scarce during the hottest months; as a rule it is good, but at some stations, as for instance, Agra, it is impregnated with saline matter. At Umballah, the subject of water supply is under consideration. At present it is brought from some little distance, and carried by conduits to the different barracks; a scheme, however, is in contemplation, whereby it is intended to bring it in increased quantity from a stream, at a considerable distance from the station. At Delhi, Attock, and Peshawur, a considerable quantity of the water is obtained from the rivers which pass each of these places; while at the various hill stations the supply is furnished by springs and water courses upon the mountain sides. At almost all stations, filters of a rough and primitive nature have been used for clarifying the water. There has, however, been in some instances difficulty in obtaining a sufficient number, matters of expense and supply being in other hands than those of the Administrative Officers of the Army Medical Department.

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* Dr. Beatson, Inspector-General, observes—"But long before, it had engaged the continued attention of His Excellency the Commander-in-Chief, at whose suggestion the Commission was appointed."—G. W. B.

† Dr. Beatson, Inspector-General, thinks this is hardly the case now. It was the fact in 1861; but in the cold season of that year the cesspools were cleared out, and filled in completely, so that the evil cannot now be very great; but the water is all brackish at Meean Meer.

By the reports of Medical Officers it is clear that in all stations every exertion was used to maintain their sanitary condition, and that never were there any removable causes of disease permitted to exist.

The dietary of the troops has remained throughout the year, as described in the remarks published in the Departmental Blue-Book for 1861. Since the Commissariat Commission completed its proceedings, some slight modification in this respect has been sanctioned. Thus, instead of the soldiers having mutton twice a-week as heretofore, they are now to have it once, this change being rendered necessary on account of the difficulty experienced in maintaining a sufficient stock of sheep. Instead of having four ounces of rice, as formerly issued daily, the men may, if they choose, take two ounces of it, and two ounces of flour. Instead of an ounce of salt, the allowance is reduced to two-thirds of that quantity, and the daily quantity of tea is to be entirely black, instead of, as heretofore, half green and half black.

It has been recommended that gardens, cultivated by convict labour, should be established near military stations, for the cultivation of vegetables for the troops, and in fact if the general orders by his Excellency the Commander-in-Chief in India, 13th May, 1864, be thoroughly carried out, there will be little left to require improvement in the rations of the soldier in this country.

During 1863, there has in some stations been great deficiency of vegetables, and at Mooltan, on account of the occurrence of scurvy, the troops had not only a ration of pickles served out to them, but also one of lime juice, as if they had been on board ship. At almost every station there were for several months no vegetables, except the ordinary country ones. A kind of pulse, called dhall, was in some cases served out to the men as a substitute; but it must necessarily have been imperfect as such, and it is almost a matter of surprise that arrangements have not been made so as to supply preserved or compressed vegetables to soldiers, where the supply of fresh ones is most difficult to be obtained.

A considerable number of Medical Officers pointed out in their reports the advantage they considered would arise by giving the soldier an occasional salt ration. At some of the hill stations this has actually been done, and highly appreciated by the men. As it is, soldiers often send to the native shops to procure country-prepared ham and pork, both of which, as obtained there, may be considered as unwholesome. It would not be so, however, were properly-prepared salt pork or beef issued to them from time to time.

Upon the whole, however, the diet of the men has been as nutritive and varied as the circumstances of the country could render it. In only a few regiments are the rations cooked for separate messes; in the great majority they are prepared in the earthen vessels already noticed, according to the taste of individual men. Each vessel is placed before the man upon a table not very clean, and destitute of a cloth.* Hence, compared with what is seen in a barrack-room in England at the dinner-hour, the aspect of meals in this part of India is uninviting and untidy in the extreme.

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* Dr. Beatson, Inspector-General, observes—"Table cloths are almost universally in use in the Punjaub. They are supplied from canteen funds, and his Excellency the Commander-in-Chief, on my recommendation, has ordered them for hospitals."

The liquors issued to soldiers under Government arrangement are porter, beer, and spirits, under the name of rum. As a rule, porter is not a favourite drink of the soldier. The greater number prefer beer, which has, of late years, been much and increasingly used by them as a substitute for spirits. While the present report was in process of completion, a general order has been issued, restricting the amount of spirits per day per man to one dram, instead of two, as heretofore, and sanctioning the issue of one quart of beer or porter per day.

In almost every station, however, the soldiers have every facility for obtaining liquors. These are procurable either in the native towns or bazaars that exist in the vicinity of all cantonments, or clandestinely at places for the purpose, at short distances from cantonments. It is to be borne in mind, that places for the manufacture and sale of spirits are under the superintendence of other than military authorities, and that a large amount of revenue is derived from those establishments. Hence, so long as present regulations on these matters are in force, it is to be feared that however great may be the care bestowed upon the soldier by his own officers, the latter have not the power to prevent evils that exist outside the bounds of their jurisdiction.

That much disease is occasioned by the use of intoxicating liquors among soldiers is beyond doubt; not only are many lives lost by excessive intoxication, and by accidents and diseases incurred during a debauch, but soldiers of intemperate habits are undoubtedly more liable to become affected with heat apoplexy during the period when it prevails than are men of temperate habits. The reports in regard to particular stations show clearly that, when the information given is to be depended on, a considerable amount of disease was caused both directly and indirectly by intemperance. It is right to state, however, that neither in the reports of Medical Officers, nor in the experience of the writer of this summary, in Indian and several other foreign stations, does the actual injury to the soldier, from the vice of intemperance, occur, which many writers and authorities attribute to it.

The proportion of men in a regiment addicted to what is called "hard drinking" is comparatively small; nor is it possible for them to indulge their propensities in this respect to the extent that could be done in civil life, on account of the strictness of regimental discipline. Men who in civil life would be in a chronic state of intoxication and still able to continue their ordinary avocations, would in the army be confined as prisoners on the first occasion of their becoming intoxicated, and so kept under restraint, until such time as they became completely sober. On a reindulgence in the vice, similar measures would be adopted, and thus, while in the statistics of regiments a large amount of drunkenness is made to appear, the actual duration and amount of it is less than among artizans of the lower orders in the United Kingdom.

Vice and intemperance in the army are ever ready terms used, not only to traduce the character of the soldier, but also to account for the immense proportion of sickness and mortality, to which, as compared with the civilian, he is subject. In regard to the former of these, however, while it is easy to obtain statistics of its rate of prevalence in the army, it is only by indirect means that an approximate idea of its extent in civil life may be acquired; these means being, observation of the ulterior results of the disease which give character to the maladies that prevail among all ages, and great variety of classes in the United Kingdom. In respect to intemperance among soldiers it is undoubted, that much sickness and mortality is thus accounted for that are respectively induced by the vicissitudes of climates to which soldiers are subject, the duties they have to perform, and the frequent occurrence of periods during which they are deprived of their natural amount of rest.

Much has been done in India to render the clothing of the soldiers as suited to the climate and seasons as circumstances will permit. Yet to effect this completely would involve a much larger kit than he could afford to purchase, or conveyance be conveniently obtained for. The Cavalry and Artillery have the ordinary English clothing, and in addition, white cotton clothes for wear during the hot season. In addition to this, the Infantry have light serge coats. During the rainy season, at which time the heat of the climate is great, the light cotton-clothing then worn soon becomes saturated, and from inability of the soldier to change it so often as this occurs, not only does it become unpleasant to wear, but there is reason to believe that it is, in some instances, productive of injury, by retaining wet and secretions in contact with his body. Hence several Medical Officers express an opinion that all troops should at this period of the year wear thin woollen clothes.

In some parts of the Command, as for instance in Bengal proper and the provinces immediately adjoining thereto, the weather, even during the winter months, is never so cold as to render the wearing of thick English clothing quite agreeable. Hence were no other considerations than those of a sanitary nature to be taken into account, it would be advisable that soldiers quartered there should have the advantage of much lighter clothing material than what are required by the climate of the inland stations.

It is now in contemplation to get a proportion of waterproof clothing issued for the use of troops, more especially convalescents, at those hill stations where the rainfall is large, so that they may not, as at present, be altogether prevented from leaving their barracks; but that soldiers going on duty may have the advantage of a shelter suit, as is allowed in England.

The boots issued to the men are of English manufacture. With a few exceptions, foot soreness did not occur among the men, and in almost all these, the cause assigned was continuous marching. Where any defects were observed in the boots, they were at once changed.

The material of the soldiers' bedding and the manner of supply are both very different in India from what occurs in both these respects throughout England's other dependencies. Here each man is provided with one cotton quilt, one coarse woollen blanket, two thin flimsy cotton sheets, and one cotton rug. These articles are his own property, and wherever he goes, are carried about among his baggage, the whole being rolled up in a canvas cover provided for the purpose.

In the above list neither pillow nor mattress is enumerated, neither in fact form part of the soldiers' bedding in India, and hence his comfort in bed must be of the smallest, even were he not exposed to great heat and the combined annoyances of mosquitos and other insects. His cotton quilt cannot from its very nature be washed, hence, during the year it has to last, it becomes saturated with secretions or more offensive matters in exact proportion to the habits of the owner. The sheet is so very thin as to be no protection in the cold weather against the coarse blanket used by the men. The bedstead is, for the most part, of wood, with tape or rope bottoms, in some instances with cane-work; but in all so infested with bugs that at some stations injury to health is attributed to the want of sleep and irritation, occasioned by their depredations, and an arrangement has had to be made for boiling the cots at short intervals, so as thus to destroy these insects.

When a regiment moves from one station to another, or takes the field, the bundle of bedding of each man accompanies it. On arriving at the new barracks, instead of obtaining clean supplies of sheets and rugs, or blankets, as would be the case elsewhere than in India, their own stock, however soiled it may be, has to be piled upon the cots provided for them. Strange that under such circumstances, there are a few Medical Officers who, in these respects, state that the bedding was clean. It may perhaps have been so in a comparative, but could not have been in an absolute sense. It seems to have been aired very regularly, and in some regiments pans of charcoal appear to have been used in barracks for this purpose while the rainy season continued.

The extent of duties performed by the troops present, as reported by individual Medical Officers, a variety that strikes one at first sight as being remarkable. As a rule no evil is attributed to these duties; but at some stations the reports are less favourable. One Medical Officer reports that the spirits of his men are depressed and broken by the amount of duty they have to perform. Another states that they do not indulge in the means of amusement provided for them, because their duty is so severe. As would appear also from the reports, the men have not, in some instances, if their Medical Officers report correctly, a sufficient number of nights in bed for the requirements of health, and it does not appear very clear why different bodies of troops of the same branch of the service, and occupying the same stations, should have so very different a proportion of nights in bed, as it is evident, from what is stated, is the case.* The hours at which drill takes place, are during the hot season, soon after daylight, and in the afternoon, a little before sunset. In the cold season, at the more inland stations, the morning parade takes place at 10 a.m.

That it is necessary to parade the men thus early in the very hot weather, is no doubt the case, as the temperature at a later hour becomes very high. It appears, however, no less evident that this very necessity operates unfavourably on the health of the men. They are in the early part of the night unable to sleep from the heat of the climate, it does not often happen that the temperature moderates towards morning; but a man then, generally from fatigue, falls into a sound sleep, from which, before daybreak, he is roused up, and thus languid and unrefreshed, he begins another exhausting day. True this is an evil of less degree than what would happen were the parade to be held after the sun had attained its power. It is, however, an evil that is inseparable from the circumstance of military life, and which, in conjunction with others, which affect the soldier, seems to induce part of the sickness and death to which he is subject, in excess of corresponding classes in civil life; a few recommendations on the subject of drills, were made by Medical Officers, and seem to have been attended to.

At almost every station means were in progress to provide the soldier with ample amusement. Perhaps Mooltan is the only exception to this. At some of those, where such means have been provided, the soldiers do not, it is stated, make much use of them; at others they do, and it is fair to conclude, in fact, the assertion is made from practical observation, that as individual Commanding Officers refrain from inflicting upon men under them duties of an unimportant nature, although in themselves worrying and annoying, so is the degree of cheerfulness and general efficiency of the men, their disinclination to go to hospital for trifling causes, and the energy and zeal with which they indulge in available means of recreation. In one of the reports from Peshawur, it is stated that during the prevalence of the great sickness there, the men had no "heart" to indulge in games.

Very few of the canteens in this part of India have tap-rooms attached to them.

In the great majority of places the canteens themselves are nothing more than liquor stores. Men drink their allowance at a kind of bar, and having done so, loiter about the door, or go away anywhere, as their inclinations dictate. In some regiments a barrack-room is fitted up as a canteen, a tap-room for soldiers, and another for non-commissioned officers, arranged and provided with various games, newspapers, and periodicals.

In some such there is a coffee-shop, where coffee, cold meat, bread and cheese, &c., are obtainable. In two regiments, namely, 7th Dragoon Guards and 35th Foot, a soda-water apparatus is in use. When such establishments exist, the Commanding Officer takes a great interest in them. The articles sold are, therefore, good, and the general management carefully looked after.

The amount of crime and punishment in each particular battery or regiment is given in individual reports. It has been found impossible, however, with the limited establishment of clerks allowed in this office to make such a summary of these as would render it possible to obtain definite information on this important subject. In regard to the statement of the lock-up rooms and prison-cells, these seem, as a rule, to be satisfactory, and where exceptions to this exist, means are in contemplation to remedy them. It is to be borne in mind that many of the stations are purely temporary; that a redistribution of the British force in this country is contemplated, and that, therefore, the establishments are in several instances those of an encampment, rather than of a permanent military station.

Re-vaccination does not seem to have been practised in many instances. In some, no particulars, in regard to it, have been recorded. In others its almost universal failure is mentioned. Small-pox affected the troops to a very inconsiderable extent; a few of the subjects of the disease were men, who bore satisfactory marks of vaccination. In one instance, the man had, it was stated, been several times vaccinated, but without result.

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* Dr. Beatson, Inspector-General of Hospitals, observes—"The Commander-in-Chief's orders, on my recommendation, are that the men are to have at least five nights in bed; if they have not, the circumstance is at once brought to his Excellency's notice."

The troops have been remarkably free from zymotic disease in 1863, the rates of sickness and mortality being much below the ratios of past years. Cholera, which is ever present in India, broke out at a few stations, but with much less virulence than heretofore. There is, however, every ground to believe that, on the present occasion, the alacrity with which the troops were broken up into detachments, and sent into camps, had much to do in averting the intensity, which, under other circumstances, the disease might have acquired. At some stations certain diseases appeared to have depended solely on local causes; but these causes are of an irremediable nature, thus at Peshawur the extensive prevalence of fever was doubtless traceable to the physical conditions of that station. At others, as for instance Delhi, a peculiar condition of phagedemic ulcer is always prevalent; at Mooltan, the troops suffered from scurvy and fever, the latter, in some degree, attributable to overcrowding in barracks; at one station, the men of a particular regiment, namely, the 51st at Rawul Pindee, suffered from ophthalmia, not from any cause of a local nature, but from the disease having become, as it were, endemic in the corps, it having existed for ten years, notwithstanding all endeavours made to eradicate it.

The prevalence of syphilis has at last attracted public attention. The subject has been under consideration of the Sanitary Commission for Bengal, and an act has been passed in Council, under the operation of which it shall be lawful to adopt means for the repression of this evil of a nature that heretofore were impracticable. It is, therefore, to be hoped, that great as have been the ravages of this disease among the troops a rapid decrease in this respect may, for the future, be anticipated.

The information contained in the majority of reports by Medical Officers on the subject of phthisis pulmonalis, is not so complete, as could be desired. It would appear, however, from what is stated, that a large proportion of the cases of that disease occurred in men hereditarily predisposed to it; a few are attributed to hereditary predisposition and syphilis. The other chest diseases seem to have been attributable to the causes which, in the United Kingdom, give rise to them, namely, alternations of temperature and exposure of the men to cold.

As a rule the sick in hospital have at all times more than ample space. The wards have not been nearly filled. In only one or two places has there been any crowding, and in these it arose from temporary causes that could not have been avoided.

The Regimental Hospitals in this part of India are for the most part capable of containing 15 per cent. of sick to strength, a ratio that is only under exceptional circumstances, reached; hence the large amount of cubic space shown to have been enjoyed by the men, varying, as it did, from 2,000 to 5,000 feet. Ventilation is for the most part affected by means of doors, windows high up in the walls, and roof openings. In those parts of the country, where fires become necessary during the cold season, they have been supplied, in a few cases, in the wards, in others, in the verandahs. The fuel being imperfectly-dried wood, considerable inconvenience has in some instances been occasioned by the quantity and pungent nature of the smoke arising from it. Another means of warming the wards in winter is to place against each archway leading into them wadded curtains, and thus to exclude, in a great measure, the air from entering. This plan is generally adopted in the Punjaub, the curtains being rolled up, so as to admit ventilation during the day.

There are no water-closets in hospitals in this country; latrines exist at a little distance, covered ways leading to them from the wards. Great improvements are being made in regard to these, the dry system of conservancy is being more effectively carried out than was heretofore done, and a better description of pan being used than was formerly. Drainage is well attended to in all places where the nature of the ground permits, and in no more than one or two stations are any unfavourable remarks made on this point.

The supply of water for hospitals is for the most part precisely similar to that for the barracks. Filters are always used, although of so rough a construction as not to be by any means effectual, when compared with those used in other colonies.

As a rule, the bath and ablution-accommodation connected with hospitals in the Bengal Command are very imperfect. Few, if indeed any, regular bathrooms exist, such as are to be found in hospitals at home. There are generally some more or less imperfectly made slipper-baths, and these, when in a serviceable condition, are brought into the wards, where, exposed to the various currents of air and other inconveniences, the sick man has to be put into one.

There are, however, difficulties in the way of this, for one Medical Officer mentions that the Indian authorities objects to "pass" his charges for firewood used in heating the water for the purpose, without, in the first instance, being furnished with the explanations as to the circumstances which rendered a bath necessary.

In some hospitals, places for ablution are placed in the covered ways leading to the latrines; in others a portion of the verandah is divided off for the purpose, the arrangement in both instances being most imperfect and objectionable. At other stations, however, more complete provision in these respects is made for the sick, and whenever improvements can be made in existing arrangements, they are being effected.

The means for cooking the food of the sick are almost without exception objected to by Medical Officers. They are, in fact, at most, identical with those for healthy men in barracks. On account of the moderate allowance of pay given to cooks, efficient ones are not obtainable. There are no conveniences in the cook-rooms for retaining, ready at all hours, such articles of comfort as the sick require.

In almost all instances, the hospital wards have been limewashed twice during the year, in some oftener, and in one or two instances, the operation could only be performed once, and that in the cold season. In the hot it was impracticable to obtain other accommodation for the sick except in tents, in the event of the walls being limewashed, and the intensity of the heat was such as to render tents at this season very undesirable.

It does not appear that throughout | the year, more than an isolated case of cholera occurred in the hospital wards, except at Benares, where without any evident circumstance to account for such an occurrence, the disease, on appearing in the station, attacked some of the sick in the wards. In such instances the buildings were at once vacated.

Doubtless many points are noted in this summary, which have been discussed in the proceedings of the Commission which lately inquired into the sanitary condition of the army in India. Up to the present date, however, no copy of these proceedings has been delivered at this office, and hence the writer of this summary has laboured under various disadvantages as to the particular points to be brought most prominently forward.

MEMORANDA AND LETTERS BY INSPECTOR-GENERAL BEATSON, M.D.

THE following letters and memoranda upon sanitary subjects have been furnished by Inspector-General Beatson, M.D., for the information of His Excellency the Commander-in-Chief in India:—

Inspector-General Her Majesty's Hospitals Office,
Head Quarters, Simla, 16th June, 1864.

SIR,

The Commander-in-Chief having expressed a wish that I would submit for His Excellency's information my opinion on the sanitary conditions of barracks, the means of mental and bodily recreation and amusement furnished to the soldier, the means of personal ablution, &c., founded on my observation during my late tour with His Excellency's camp through the Punjab from November till April, I have much pleasure in forwarding what may be considered as a summary of my inspection reports, which are now completed, and of which duplicates will shortly be ready for submission to His Excellency through the Adjutant-General.

2. I may premise that between November and April I visited the following stations, and made inspections of the barracks and hospital at each, viz.:—

Umballa
Meean Meer
Umritsur
Nowshera
Peshawur
Attock

Campbellpore
Rawul Pindee
Muree } Barracks
Jhelum } not occupied
Sealkote
Dhurumsalla

Kangra
Jullundur
Phillour
Kussowlie
Dugshai
Subathoo

3. I can, therefore, as regards the Punjab, speak from personal observation on the several points on which His Excellency has desired me to express an opinion. These points are:—

I. The means of ablution.
II. The movement of troops in times of cholera, and the beneficial results thereof.
III. The additional space afforded in, and improved ventilation of, barracks.
IV. Improvements recommended by the Commissariat Commission, which was assembled on the suggestion of His Excellency the Commander-in-Chief.
V. Diminution of spirit ration, and the establishment of refreshment rooms in or near the regimental institutes or reading rooms.
VI. Reading and games rooms.
VII. Healthy bodily exercise afforded by means of fives' courts, skittle-alleys, gymnasia, cricket, quoits, long balls, and the establishment of workshops, gardens, and theatres.

I.—MEANS OF ABLUTION.

4. In nearly every instance these means comprised good roomy ablution rooms, with an ample supply of water, with gratings for the men to stand on, and with basins, either metal ones built into the ledges, or earthenware ones placed on them. The most serious fault generally to be found with the ablution-rooms is their imperfect drainage, and the arrangements that nearly in every case exist for the reception of the used refuse water. The arrangement generally is a deep sunken built cesspool, which is, with great difficulty, emptied and cleaned out, and through which, moreover, if the chunam be broken, the contents must percolate into the soil. Moveable vessels, half hogsheads for instance, coated with coal tar or doona, would answer better for receiving the refuse water.

5. At Meean Meer, Umritsur, Nowshera, Sealkote, and Rawul Pindee there are excellent plunge baths—in the case of the larger barracks one for each wing. At Peshawur there are not yet plunge baths on the standard plan, but near both the infantry and cavalry barracks there are tanks of ample size, which are used as swimming-baths, and which would answer the purpose still better if there were dressing-sheds erected within the enclosures. At Jullundur the barracks are temporary, but in connection with the new ones about to be commenced, plunge baths will no doubt be included.

6. What has struck me as a defect in connection with the ordinary ablution-rooms is the absence of screened off portions, which would afford sufficient privacy for a man to wash his whole body. With screened off portions, a cistern or tubs full of water in each, a piece of soap, a towel, and a wooden pail or leathern bucket to pour water from over his whole body, a man could at any time (and at seasons when the plunge baths are not in use) clean himself from head to foot, and have all the advantage of a shower or chatty-bath.

7. At Umballa, as His Excellency is well aware, the means of full ablution are not easily commanded; indeed, the present scarcity of water at that otherwise healthy and agreeable station is its great evil and drawback, but as the evil is an acknowledged one, and moreover one that can be remedied by bringing water from the river Guggur, it is to be hoped the Government will sanction the most approved and effectual plan for remedying so great an evil. In a tropical climate more than in any other, cleanliness is essential to health, a free, well-acting skin warding off many congestive diseases.

II.—The Results of Moving Troops, when threatened with Cholera, out of Cantonments.

On this subject I beg to refer to my letter, sent in to the Quartermaster-General on the 24th of June last year. Soon after that period cholera appeared in the cantonment of Agra, commencing in the jail at that station. The Royal Artillery and 23rd Royal Welsh Fusiliers were immediately held in readiness to be moved out, in accordance with the instructions contained in the Commander-in-Chief's Circular 90, of 7th April, 1862, page 186. The following is an extract from the report of the very able and intelligent surgeon of the 23rd (Surgeon-Major Laing). Dr. Laing, after describing the sanitary precautions taken in anticipation of the disease (then travelling in a south-west direction for Oudh) reaching Agra, remarks:—

"In the event of cholera, notwithstanding our precautions, making its appearance in the cantonments, I objected in the strongest terms I could use to the regiment being sent either to the Taj or to Secundra, as, besides having a strong personal, and, I think, well grounded, objection to all native buildings as locations for Europeans, I was convinced that the experience of former years was against the occupation of these tombs, inasmuch as the regiment sent to them did not get rid of cholera, and suffered afterwards most severely from fever, which I feel certain they caught during their sojourn there.

"I recommended that the men should at once *cross the river*. This, I am happy to say, was carried out. We immediately *shook off the cholera*, and we have not been injured by fever."

Dr. Laing adds, "I beg to be permitted here to remark that so anxious were Brigadier Troup, C.B., and Colonel Wells, C.B., for the health of the men under their command, that I had only to make the slightest suggestion to either of them on any sanitary matter, and I was sure it would be at once carried out."

So successful was the move across the river that, further on in his report, Dr. Laing says "no cases even of diarrhœa occurred after crossing."

I doubt if Dr. Laing could have made the same favourable remark if the men had been moved into any of the native buildings.*

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* In a subsequent communication the Inspector-General observes: "Had I however an opportunity of referring to my paper of the 16th June, I would add, in a supplementary form, some further remarks on the removal of troops in times of cholera, the experience of this past season having strengthened every one's conviction on the utility of the measure, if early and judiciously adopted."

III.—ADDITIONAL SPACE IN AND IMPROVED VENTILATION OF BARRACKS.

1. I am well aware of the great and (if I may be allowed to say so) the very sensible importance which Sir Hugh Rose attaches to this subject, and how he has laboured to effect so desirable an object. There are, however, difficulties in securing the full amount of superficial space which His Excellency cannot of himself remove.

2. The Commander-in-Chief has no power to order new or additional barracks. He can but urge the necessity for increased accommodation, and this Sir Hugh Rose has ever urgently done. If his representations are not, or from financial considerations cannot be immediately entertained, His Excellency can but use the means at his disposal.

3. One difficulty connected with this subject of space in barracks arises from the fact that an idea here and there prevails (not in the mind of the Commander-in-Chief) that as long as a man has his 1,000 cubic feet of air it is unreasonable to ask for more. A man may have a thousand cubic feet of air, and be next thing to stifled; just as a man may be suffocated from impure air in a dense crowd, with the unlimited atmosphere above him. So men sleeping for seven or eight hours at a time in huts where the superficial space allotted to them has been below a certain amount, have suffered from severe types of fever.

4. The true starting point must always be this—give a man from 84 to 90 superficial feet of barrack floor, and the cubic contents (in India at all events) may be left out of the question.

If a man has 90 superficial feet he must in this country be all right as regards cubic space, as no barrack in the plains of India, and few in the hills, is likely to be under 15 feet in height; if it is even 12, it gives 1,080 cubic contents; but the converse of this will not hold, a man may have 1,000 cubic feet, and have only 45 superficial feet. At Umballa for instance (the barracks there are not unusually high), the height is 24 feet, and as a result (as shown in last return), the cubic space in Infantry Barracks is 1,552, the superficial space only 64. In the Royal Artillery Barracks the cubic space is 2,270, the superficial 93.

The latter is about what is proper, but to obtain it involves a cubic space of double what is generally considered sufficient. I have not yet seen the Report of the Sanitary Commission for India (no copy having been furnished to any of the Administrative Medical Officers of Her Majesty's British service, although I believe furnished to all of the Bengal Medical Department), but if any definite cubic space *only* is mentioned, that space, however liberal, although 1,200 cubic feet, may still leave the men far too closely packed.

5. As regards ventilation, great and undeniable improvements are visible in almost every barracks, at all events in all new ones. These buildings, taking the usual standard plan, have a centre room, generally with pent roof, along the ridge of which there is generally full, or at all events partial, ventilation, by the whole or portions of it being raised; in addition to this, there are rows of window ventilators along upper part of walls.

6. These add greatly to the light and cheerfulness of a barrack, and if kept open cause a thorough perflation of air through the room. There are also the numerous doors and windows, the former often merely open arches, which are found in all the newer barracks in the country.

I have seen and heard complaints of the absence of ground ventilation, it being alleged that when the doors are shut there are no *in*lets for fresh air. Ground ventilation is now abandoned by the best authorities; and after full consideration of the subject, it has been laid down by the Commissioners appointed to report on the sanitary condition of barracks and hospitals in the United Kingdom, that the *in*lets for fresh air as well as the *out*lets for foul should be near the roof. The fresh air is heavier than that which has been expanded by the heat of the room,* so that the former necessarily descends, and as it does so the other rises and escapes through the outlets provided for that purpose.

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* This condition is somewhat modified during the hot season in India.

7. As mentioned above, in some barracks, those for instance at Umballa, although there is more than the regulated amount of cubic space, there is not floor space for a whole regiment; as a proof, however, that this circumstance, where it exists, has not been overlooked by the military and medical authorities in this country, tents were last year provided on the recommendation of the surgeon of the 98th Regiment at Umballa during the hot months for 16 men per company.

The surgeon 23rd Fusiliers, at Agra, recommended the same arrangement, and it was there also complied with, and I have very lately requested Deputy-Inspector-General Dr. Gordon, C.B., at Calcutta, to move the divisional authorities at Benares to meet the recommendation to the same effect of the surgeon in charge of the Royal Artillery at that station.

8. This arrangement is nevertheless but a make-shift, and men sleeping on a crowded barrack floor are just as likely to suffer as much, perhaps more, in cold weather than in hot; but still it is all that the military authorities can do, or the medical can recommend, until the Government see fit to give more barrack accommodation.

IV.—Improvements Recommended by Commissariat Commission.

On the suggestion of His Excellency the Commander-in-Chief, a Commission was appointed two years ago to inquire into the working of the Commissariat system, and what improvements might be deemed practicable in the matter of rationing the troops. It is to be hoped some good results will follow, but under the system of native contractors, and contracts at probably too low a rate (14 lbs. of beef and 12 lbs. of mutton for the rupee are not unusually low rates) requires the greatest vigilance on the part of the regimental authorities to secure the issue of good wholesome meat for the soldiers. It is towards the removal of this evil of persistent attempts to issue inferior rations that His Excellency the Commander-in-Chief has so constantly directed his attention; but the Commissariat Department and its executive officers are, in this country, responsible to and under the orders of the Civil Government, not, as elsewhere, under those of the military authorities; hence in cases of neglect, or of want of sufficient supervision on the part of a Commissariat officer, the Commander-in-Chief, or his representative the officer commanding on the spot, cannot come down at once and call him to account, but must do so by a reference to Government.

The Commissariat Department of the British army was long a branch of the Treasury; the experience of the Crimean war pointed out that its proper place was in subordination to the War Office and Horse Guards.

2. In this country, I believe that on the whole good rations have been issued, but I fully believe, at the same time, that the least relaxation on the part of regimental authorities would have led to attempts to palm off on the soldiers articles of food of a very inferior description.

3. In connection with the subject of rations comes that of cooking, and on this subject His Excellency's General Order of the 13th June, 1863, is most full and comprehensive, and when that General Order can be fully carried out, the greatest possible good results will follow. At present, however, such is the nature of most of the regimental cookhouses, that efficient supervision by an European soldier is quite out of the question. In the hot weather no European could stand the temperature and smoke of a barrack cookhouse, as at present constructed, for half an hour with impunity.

4. I am no advocate for any elaborate cooking ranges for native cooks; a simple, cleanly, cheap mud or brick range is all that is needed, and this, with tables, cupboards, and safes for keeping the meat, with shelves and chopping blocks, are all that are necessary in the way of furniture; but great alterations and improvements are needed in the construction of cook-houses, and I understand these improvements will now be sanctioned. One most important requirement in every cook-house are flues to carry off the smoke, and over the cooking range a screen of wattle and daub should come down at an angle from the roof to within 6½ or 7 feet of the floor, to conduct the smoke towards the flues. At present the cooking goes on anywhere in the room, and the whole apartment is full of smoke. There should also be a room for the European superintendent.

5. With native cooks to deal with, the range no doubt should be simple; but that they, the native cooks should be allowed to continue their present filthy habits is out of the question. If naturally dirty, they must have cleanliness at all events in the matter of cooking the soldiers' food enforced upon them by European supervision. Such they have never hitherto had; they have been allowed to wallow in filth (chopping meat on the floor, leaving it lying about to be rendered unwholesome by swarms of flies) until the subject engaged the attention of His Excellency the present Commander-in-Chief; and if his orders have not been carried out to the full, it is almost entirely from the inadequacy and objectionable structure and condition of the present cook-houses.

6. I have not alluded to ovens for company cook-houses, for I think, from what I have seen, that one oven for a regiment is much preferable.

V.—DIMINUTION OF THE USE OF ARDENT SPIRITS BY THE SOLDIER.

Under present regulations in Bengal and Madras (the allowance in Bombay, from statements I have seen, appears to be larger) the allowance is one quart of malt liquor and one dram of spirits, or two drams of spirits if no malt liquor is available from the Commissariat. A quart of malt liquor without spirits is, I conceive, ample for any man under ordinary circumstances, and I know such to be the private opinion of His Excellency also; but it must be recollected that the issue of spirits to the soldier, not in India only, but in all British colonies, is a very old-established custom, and being so, is not easily rooted out. In India the allowance of spirits is reduced to a minimum when malt liquor is available, and this it almost always is.

That a moderate quantity of good wholesome beer will do a man much injury, I do not believe, particularly when, as is often the case, the men have a good deal of active exercise in the way of fives, skittles, cricket, quoits, or long balls; for all these games *are* played for many months in the year. There is scarcely a station I have seen without a ball-court, and skittle-alleys are universal. In the North-West and Punjab, and at all hill stations, the men are constantly engaged at some of these in the open air during the day-time.

VI AND VII.—READING AND GAMES. MEANS OF HEALTHY BODILY EXERCISE.

The diminution of the spirit ration, however, is not the chief means which have of late years been brought into play to wean the soldier from any bias to intemperance; he has (notwithstanding the opinion which, out of India, unaccountably seems to prevail to the contrary) many ways of usefully passing his time. In connection with every barrack which I have seen in India (and during the last four years they have not been a few) I have found, I believe I may say without exception, excellent reading-rooms, with plenty of books and papers, ample means for playing all the usual innocent games of draughts, backgammon, chess, dominoes—in many of the rooms were bagatelle tables, and in connection with these reading and games rooms, refreshment rooms, where the men can have tea, coffee, cold meat and bread, soda-water and lemonade—in fact everything in the way of refreshment except spirits at a reasonable rate.

Some commanding officers (for instance, of 7th Dragoon Guards) have had soda-water machines sent out from England which repaid the cost in a very short time, and supplied good wholesome effervescing drinks at about one anna a bottle. Then again in the great proportion of regiments there are theatres and excellent workshops, including in some, in fact in many, printing presses and bookbinding establishments, carpenters' and ironsmiths' shops, besides the more usual ones of shoemakers', tailors', and armourers'. One reason why these institutions have not been even more developed has been the want of suitable buildings, so that to provide room for them barrack space had to be encroached upon.

3. Government have, however, I believe, now decided that suitable accommodation for all regimental institutions is to form an integral part of every barrack.

4. Another source, not only of amusement but of healthy active exercise, is the cultivation of soldiers' gardens, which are to be observed at almost every

station. At Dugshai, for instance, the 42nd have converted a barren waste into many tastefully laid out and well-cultivated gardens. At Kussowlie the 94th bid fair to have some excellent gardens also, while the 3rd Battalion Rifle Brigade had made most praiseworthy and successful attempts even on the unpromising soil of that dreary desert Meean Meer.

VIII.

These remarks may, however, be taken as chiefly referring to the more favoured portions of the Presidency—I mean to the stations where, at all events for many months of the year—the men can enjoy out-door exercise. In the steamy, relaxing heat of Bengal the European is not equal to the real enjoyment of active exercise, either of mind or body; he too often languishes under an oppressive and rapidly exhausting temperature, becomes listless and indifferent, rushing too often to the spirit-bottle, or to excessive indulgence in the stupefying narcotic with which he fills his pipe.

2. In such climates and localities men no doubt engender disease by the inactive life they lead. They eat, drink, smoke, and sleep, but beyond their drill duties and an evening stroll, take but little that deserves the name of exercise;—(and are they or the climate most to blame for this?) This state of things, however, being the case, is there any remedy for it? The only really effectual one I know of is to keep as few men as possible in the low relaxing stations of Bengal, and to keep every man, not absolutely required for duty in the plains, in healthy and convenient localities in the hills.

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I have, &c.,
G. S. Beatson, *Inspector-General.*

*The Military Secretary
to His Excellency the Commander-in-Chief.*

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*Inspector-General Her Majesty's Hospitals Office,
Head-Quarters, Simla, 4th July,* 1864.

Sir,—The Commander-in-Chief having requested me to furnish, for his Excellency's information, my views, judging from its historical antecedents and statistics as well as from its topography, its position, its physical aspect, and the nature of its soil, of the probable future healthiness or unhealthiness of Meean Meer, I have no hesitation in recording that my opinion of Meean Meer, as a cantonment, is decidedly unfavourable.

2. In the report of my inspection of that station, made in November last (one copy of which report has been sent to the Adjutant-General for information of his Excellency), are the following remarks:—

"There are no apparent or very prominent sources of local malaria, but there are few places in which epidemic agencies have been more fully developed than at Meean Meer, attributable no doubt in part, and probably in a considerable degree, to the abominable cesspool system so long in use at this station. The geological formation, however, is one that is extremely objectionable, the substratum, as is well known, being a bed of kunker or impure limestone. This impermeable substance almost immediately below the surface must be unfavourable to the salubrity of a locality; while from its unproductive properties, and the miserable stunted vegetation which is the result, the whole place has the look of a bleak and dreary desert, and one can easily imagine the increased depression which such a physical aspect in the surrounding scene would produce on men's minds during an epidemic of cholera."

3. The experience of late years has fearfully confirmed the traditional reports of this locality having been, previously to British occupation, an unhealthy spot; and although in the Report of the Cholera Commissioners it is stated that there appeared to be no foundation for the belief that during the Sikh rule Meean Meer was unhealthy, mention is immediately afterwards made of one severe outbreak of cholera in 1831 and another in 1842, while more recently there have been the outbreaks of 1856, 1861, and 1862.

4. There is no doubt much truth in the fact as pointed out by the Commission that the pre-disposing causes which existed in the extremely insanitary

condition of Meean Meer in 1861 tended greatly to intensify and aggravate the virulence of the disease; but still that virulence was almost unprecedented, and bespeaks an intensity of cause which must have been unusually great; for although crowded barracks, surrounding filth, impure water, and undrained grounds, will powerfully predispose a locality to cholera, there must be the specific cholera agent, whatever that may be, to develop the disease in an epidemic form.

5. That an impermeable soil, like that at Meean Meer, is not the one to choose on sanitary grounds, none will question, while the physical aspect of the place is little better, perhaps worse, than that of a desert. In the latter there is no pretension, while at Meean Meer there is witnessed at every step the well-intentioned, but hopeless, efforts to clothe the arid waste with trees, which for a year or two sprout and grow, fed by the earth placed around them, but in course of a few years when they reach the cold, impermeable, unproductive substratum of kunker they wither and die.

6. There is a statement in the Cholera Commission Report which is no doubt founded on reliable statistics; it is this, that during the six years commencing with 1846-47 the annual mortality averaged 84·61 per thousand. In 1851-52 Her Majesty's 96th lost 132·5 per thousand, and the Bengal Fusiliers no less than 218·6 per thousand, which great mortality was chiefly caused by fever and dysentery.

7. In 1851 the evils of the cesspool system could not have been greatly developed, and cholera is not mentioned as causing any large proportion of the deaths. Here there are evidences of a bad endemic condition connected with the locality which may raise the question whether the providential escape of the Rifle Brigade from sickness in 1863 is to be taken as a sufficient ground for expecting such continued fortunate results to troops located in this ill-favoured spot.

8. In 1862 the sanitary condition of Meean Meer was as good as that of any other station in the Punjab; the epidemic of that year was scarcely less severe than that of the previous one, and who can tell if the epidemic cause should pass over Meean Meer in 1864 that endemic agencies might not again contribute to its fatal development, although the scenes of 1861 would not, I trust, ever again be witnessed; or that bodies of men struck with the pestilence would ever again be left to its devastating ravages without early and decided action being taken to remove them from infected localities.

9. Lastly, it is an acknowledged fact that apprehension and dread of cholera has a powerful predisposing influence in developing the disease, and it is equally a fact, which ought not to be ignored, that no corps goes to Meean Meer without a general dread that they may be the victims of a similar pestilence to that which is associated in their minds with the occurrences of 1861 at this ill-reputed station.

I have, &c.,
G. S. Beatson, M.D.,
Inspector-General of Hospitals.

The Military Secretary
to His Excellency the Commander-in-Chief.

Inspector-General H.M. Hospitals Office,
Head Quarters, Simla, 18*th July,* 1864.

Memo.—Forwarded through the Military Secretary to his Excellency the Commander-in-chief.

1*st Query.* The requirements of British troops in India, as regards sanitary stations in the mountains, have been met on the principle of sanitary depôts for individuals, and mountain stations for regiments; although neither, especially that for regiments, has received sufficient development. The opinion has been lately expressed that it would be desirable not to send regiments but detachments, say 200 men per regiment, to the mountains; respecting which point, that is sending detachments instead of regiments, you are requested to have the goodness to give your opinion *in extenso.*

Answer. I fully believe if the health of the large army of British troops now in this country is to be maintained, and the efficiency of the force preserved, that a large proportion of it must be located in the hills; but at present there are no means of carrying this out, there being but two hill stations in this Presidency for regiments.

The strength of the British troops in Bengal alone was, during 1863, 42,118 men. Up till May, 1857, the total force of Europeans in Bengal, including the local troops then in the service of the late East India Company, amounted to 19,637, a difference of 22,481 men. In 1857 there were as many regiments in the hills as there have been since; allowing, therefore, that there were at that time (1857) 2,400 men in the hills, there remained for service in the plains 17,237. Granting that this number was *far inadequate* to the requirements of the strategic positions in the plains, and that we add to it, even so large a number as 12,000 men, making a total of 29,273 for service in the plains, there is still a surplus of 12,845, who may reasonably be looked upon as a reserve, and of whom every man, if health and efficiency are to be studied, should be in the hills, or at elevations free from malarious influences, and with temperature such as the European frame can bear with impunity.

As to the composition of the force to be thus located in the hills, my opinion is most decidedly in favour of entire regiments instead of composite battalions, an opinion in which, in a military point of view, I feel certain every military man will coincide. By sending regiments to the hills, they simply change their locality and better their climate, while every thing else remains the same; their institutions accompany them, their officers proceed with them, their discipline goes with them too; in fact there is everything to remind the men that although their locality is changed, and they are enjoying a better climate, they are still under their own accustomed regimental system: their duties, their drills, their social regimental ties of comrades and companions, their workshops, and other institutions are all with them. On the other hand, in breaking up regiments and trying to amalgamate men of different corps into a composite battalion under, it may be, a different system of duties, and an internal economy different from that to which the men have been accustomed, neither their well-being nor their happiness is increased, indeed both are much more likely to be seriously diminished. A regiment in the British service is like a family; they enjoy having the occasional society of friends, but there is still the family circle, so to speak, into the unrestrained confidence of which strangers are not willingly admitted.

Those who have not served in regiments may not understand this, but those who have all know how fully it exists, and that it is productive of much more good than evil.

If, however, we view this question of entire regiments or composite battalions not so much from a military as from a medical point of view, every thing is in even a much greater degree in favour of having entire regiments at hill stations. In the first place, it is an acknowledged fact among all medical authorities who have studied the subject, or who have had any practical experience of hill climates in the tropics, that the beneficial effects of such climates are wonderful when applied *to the prevention* of disease, as well as in warding off that wear and tear of constitution and general deterioration of health which are inseparable from continued residence in the plains of India, but that their effects are by no means so satisfactory in removing disease, or even a tendency thereto, when already present. Now, the idea of composite battalions PRE-supposes a state of impaired health which is to be corrected, not prevented, by a residence in the hills; inasmuch as the idea of breaking up regiments is urged on the plea that all the weakly and sickly men can thus be selected out of every corps in the plains, and that of such sickly and weakly men the force at the hills is to be composed. This idea is wrong in theory, and any experiment based upon it will be found most unsatisfactory in its results, it is in fact locking the stable door after the steed has been stolen. It must not, however, be inferred from the above remarks, that I attach no importance to hill climates as restorative or curative agents in individuals or in bodies of men, who have suffered from long residence, or from illness in the plains; far from it. I believe, and know from a good deal of experience, of the effects of such climates, that where there is nothing more than functional derangement of the biliary and digestive organs, or debility (it may be very great and, as long as the individual remains in the plains, intractable weakness) from fever or other ailments, as well as the numerous cases of general malaria, the result of residence in a high temperature; in fact in all cases where organic disease is not absolutely present, a change to a hill station will produce in nine cases out of ten, sudden and marked improvement, if the patient is only prudent in the matters of exercise, diet, and dress. The object, however, to be kept primarily in view is the preservation rather than the restoration of the health and physical efficiency of the European force. By following the practice of only sending to the hills men who show signs of disease or marked indications of the effects of climate, a man who is apparently well this year (and who, if sent to the hills, might be fortified and set up for years to come) is kept back till the next or some future year, when he has evidently broken down, and when a hill climate may not restore him. For weakly and sickly men of regiments which are not stationed in the hills, convalescent depôts in the hills, and not indvidually too large, as I have pointed out in a previous paper, are the proper establishments; while for cases not suited to a hill climate, sanataria beyond sea are essentially necessary. I do not think it expedient that convalescent depôts and effective regiments should be in one locality.

If sufficient hill stations are provided for one-third of the European force, each regiment could (as a regiment) have two years out of every six in a bracing and healthy climate. By an arrangement such as this, much might be done to preserve a corps efficient, under all ordinary circumstances, during its twelve years' service in India; and I believe, if sufficient hill stations are established, that it would be highly advantageous that the first two years of a regiment's service in India should be spent at one of them. That a regiment can be kept in health and physical, which is only another word for military, efficiency during ten continuous years' residence in the plains, I do not believe; and I have formed this opinion after nearly twenty years' experience with British soldiers in Ceylon, India, and Pegu. Whatever may be advanced about acclimatization, all statistics and all experience are against any such theory; and both indubitably prove, that do what you will to mitigate the effects of the climate, a certain amount (and in some a very considerable and rapid amount) of deterioration of health must result to Europeans (in ninety-nine cases out of every hundred) by continued residence in the plains of India; the almost single exception in every hundred forms the corps of pensioners pointed at as proofs that Europeans can live in the plains of India to the allotted span of human existence; but may not the question be asked, how many dead men does each of these living ones represent?

Sir Ranald Martin, than whom no one has more earnestly weighed and studied this question of hill climates, most forcibly and truly remarks, "that all the known experience tends to the conclusion, that a residence in the temperate mountain regions of India, while preserving our men from sickness, would render them less susceptible to the heat of the plains;" and he continues, "the contrary supposition of all this would indeed go to prove that the keeping men in good health in the first instance tends only to make them more sickly afterwards, and that men rendered sickly in the plains of India must become less sickly by being made to continue there." This latter, however, absurd as it is, is really the supposition involved in the theory of acclimatization.

It may, perhaps, at first sight appear that my recommendation of sending newly arrived regiments to hill stations is an argument in favour of the theory of acclimatization, but it is not so.

Every one knows that on first arrival in the tropics, for the first twelve months or so, there is in the young, robust, full-blooded European a great tendency to acute disease, a tendency which is increased, if not produced, by the altered circumstances under which he is suddenly placed; his lungs, from diminished bodily exercise, as well as from increased atmospheric temperature, are no longer in that full play which tends so greatly, in colder climates, to relieve the system from internal congestion; the liver has, in consequence, much more work thrown upon it, the result of which is, in too many cases, congestion of that important organ, as well as of the abdominal viscera generally—a state of things which too frequently ends in active hepatic disease, or in dysenteric symptoms, or in both combined. Residence in the hills during the first two years after arrival, would go far to obviate these tendencies to disease. The climate of a good hill station admits of a very considerable amount of exercise; the skin in the warmer months would assist the lungs to throw off effete matter, and thus the system would get *fined* down, so to speak, to a better *tropical* standard than that which existed on arrival, fresh from a colder climate; and that, too, without losing any of its tone or vital energy.

This, however, would be a very different state of health from that produced by even the same period of residence in the plains, where the tendency is to functional derangement of the abdominal organs, increasing every day and ending sooner or later in either active disease or in great loss of vital tone, and consequent derangement of the digestive and circulating systems. Again, by early residence in the hills, the men have opportunities, in a safe climate, of acquiring knowledge of many details of personal hygiene, and of precautions necessary and useful in warding off tropical disease.

This brings me to another consideration, which is, how long should a corps remain in the plains at one time? I hold that every regiment's second relief should be to a hill station, that is two years in the hills to every four in the plains; but if the climate of the station at which a corps has been for the previous two years is a trying one, that such a corps should be moved to what I would call an intermediate climate—a consideration which involves the expediency of having well-selected stations ranging from 3,000 to 4,000 feet, with a moderate rain-fall, and a dry bracing climate, for *recovering* the health of regiments which have suffered at such places as Meean Meer, Agra, Delhi, Peshawur, Gwalior, Jhansie, Mooltan, and Allahabad; while for healthy regiments which are sent to the hills *not to get well, but to keep well,* the elevation should be from 5,000 to 7,000 feet in well selected localities, as open as possible, and not too closely surrounded by higher hills. Among the former class of stations Subathoo may be classed, although were that station on an open plateau instead of in a basin, its temperature would be much lower. It is upwards of a 1,000 feet higher than either Bangalore or the Ramandroog Hill (known as Raman-Mully) in the ceded districts; from June till October, Bangalore and Ramandroog are both, I believe, cooler than Subathoo, although in the winter months the latter must be much the colder.

I cannot help here remarking, that with such a delightful hill as Ramandroog, with its level plateau of fully three miles in circumference, with plenty of water not far down the hill, and with a productive country all round, with a climate charmingly cool for nine months, and in March, April, and May quite bearable, situated within an easy night's run of Bellary, and with an excellent carriage road to the plateau, it seems cruel to doom Europeans (the 74th for six consecutive years before the regiment marched to embark for England) to the burning heat of one of the hottest stations in India. And why is Bellary thus occupied? not from any real military or political necessity, but simply because, without due consideration, barracks for a whole regiment were built in a most objectionable position between two mountains of burning rock outside the fort of Bellary.

Under the head of hill stations, has to be well considered the question of plan and construction of hill barracks, the space per man to be allowed, and the conservancy of such localities. Neither of the three stations in this part of the Himalayas has had full justice done in the matter of testing the effects of their climates. The barracks at Kussowlie were bad, and some of them are so still, while all the buildings are over filled at that time of the year when the depôt is occupied. At Dugshai the barracks *are* bad, and until lately the hospital was worst of all. At Subathoo, there is not accommodation for a full regiment; and many of the barracks are as bad in plan as they are in condition. With regard to space per man in hill barracks, I do not in the least subscribe to the idea that men require less space in hill barracks than elsewhere; I venture to maintain, on the contrary, that a man requires quite as much cubic and superficial space, at all events under the present plans of construction of barracks, inasmuch as the lowness of temperature causes the rooms to be closed at night, and consequently there is not that amount of perflation which is secured (if there be any breeze) in barrack rooms in the plains. Of course it would be quite practicable, and this should be well looked to in barracks yet to be built—to make the ventilation independent of doors and windows, as well as free from the evil of cold draughts blowing on the inmates of a room. At all these stations the conservancy is, as regards the barracks, well attended to; but I fear this cannot be said to be the case where there are large native bazaars in near vicinity.

In a recent communication to the Quartermaster-General I showed how I believe the barracks at Dugshai, if the present ones are considered to be worth improving (which from all accounts they are not), might be much improved in plan. In considering this question of hill residence for soldiers in the tropics, we should never forget that by moving the troops from the seaboard of Jamaica to Newcastle, the annual mortality has been reduced from 130 to 22 per 1,000. I believe it is quite practicable, if sanitary suggestions are received and acted on, to bring the death-rate in India below (and much below) 22 per 1000. But this happy consummation will never be arrived at if only sickly regiments are sent to the hills, and if every plain station which has ever been occupied by an European garrison is to be so occupied in future.

If this occupation of minor posts by Europeans is really necessary, may it not well be asked of what use are black troops if they cannot, like the men of the West India regiments, hold sickly posts, and thus enable the British soldiers to be in reserve in the hills. Of course I do not allude to really important strategic positions, with large arsenals to protect, such must be held, let the cost be what it may; but if such garrisons, where the climate is trying, were relieved yearly by troops from the hills, the loss of life and health would probably not be great.

I will venture to add, that with a voluntary and a ten years' Enlistment Act, recruiting for the casualties of 70,000 men, even at the lowest estimate of deaths, invaliding and discharges (the two former amounting, in 1863, to 58·18 per 1000) will ere long be found no easy matter, and everything should be done not only to save life and invaliding, but to attach the men to the service.

ROYAL ARTILLERY AND CAVALRY.

In advocating the frequent residence of regiments in the hills, it would be an omission if I did not point out that some arrangement should be made in this respect for the Royal Artillery. They share all the bad climates with the infantry, and one or two good stations in the hills, or on elevated table land (when it can be found), should be set apart for this arm of the service. If, for military reasons, it is thought desirable and necessary to have infantry in support, there could be no objection to having artillery at a hill or elevated station with infantry, each having their own barracks and parade grounds, as they now have at stations in the plains. The cavalry are a smaller body, and as a rule are at better stations; but if an elevated plateau could be found available it would be a boon to this arm of the service in Bengal. Madras has, fortunately, its Bangalore, and Bombay its Kirkee.

2nd Query. Is it not a characteristic of Indian epidemics and sickness that in unhealthy stations the health of the whole regiment is so much affected as to render indispensable for the recovery of their health the stationing of whole regiments in the mountains? If so, pray enumerate the evidences in point?

Ans. No regiment can go through a severe epidemic of fever or cholera without almost every man suffering. The malarious agency has been acting upon all, although some may have had sufficient powers of resistance to prevent its full development; hence, after a corps has gone through a severe sickly season at such stations as Meean Meer, Agra, Mooltan, Gwalior, Delhi, Peshawur, or Allahabad, the removal of such corps either to a hill station, or (in the absence of suitable stations, at an elevation of from 3,000 to 4,000 feet, with a moderate rain-fall) to such healthy plain stations as Hazareebaugh, Bareilly, Roy Bareilly, Jullundur, Sealkote, or Rawul Pindee, is essential to the recovery of its health and efficiency. This has been shown in the cases of 51st and 94th, sent to Rawul Pindee and Jullunder, after the fatal epidemic of 1861 at Meean Meer; of the 42nd and 82nd from Agra and Delhi to Dugshai and Subathoo; the 19th, after the epidemic of 1862, from Meean Meer to Kussowlie; the 79th, after the severe fever epidemic of last year, from Peshawur to Rawul Pindee; the 101st, from Mooltan to Pindee; and 93rd to Sealkote, after suffering severely in 1862 from fever in the Peshawur Valley.

Other changes have also been rendered necessary from residence at trying stations, such as the Rifle Brigade from Agra to Bareilly, the 27th from Morar to Gondah, and the 52nd from Jhansie and Gwalior to Hazareebaugh.

3rd Query. How long, judging from experience, does it take a regiment so affected to recover their health in mountain stations?

Ans. When a regiment has suffered severely from fever or bowel complaints, the first move, if such were practicable (I mean if such *stations* existed; I have no doubt there are plenty of such localities), should be to a station of moderate elevation, with a dry, bracing, non-malarious climate. For men who have suffered from the above diseases, a climate like Bangalore would be much more beneficial for the first eighteen months than climates such as those of Kussowlie, Dugshai, or Simla, although at a *later* period the bracing air of the latter, especially during the cold, dry months of winter, would be highly efficacious. When a regiment has suffered severely in the plains, it may, I think, be safely said that three years is not too long a period to allow for its restoration to efficient physical condition, and the arrangement which would probably be the most effectual in bringing about this state would be to give such a corps eighteen months, two hot and one cold season, at an intermediate station, and two cold and one rainy season in the hills.

4th Query. Is is not the case that, in consequence of the insufficient number of mountain stations for regiments it has been, and is, necessary to send regiments whose health has been generally affected by the unhealthiness of very unhealthy stations in the plains to stations in the plains where their recovery is only partial?

Ans. With the present number of hill stations *it is quite impracticable* to send to the mountains all the corps that require change to a bracing climate. Every regiment, for instance, that has passed a full period (say two years) at Mooltan, Meean Meer, Peshawur Valley, Allahabad, Delhi (one year), Gwalior, or Agra, should go out of the plains on its relief. To meet such requirements there are merely Dugshai and Subathoo, for I do not consider that Kussowlie should be included, there being but accommodation for a skeleton regiment, which accommodation (if there were a suitable number of hill stations) would be much better appropriated to the depôt, as it could all be filled by weakly men from regiments in the plains. The recovery of corps which have been prostrated by sickness cannot be complete without the men having the advantage of a thoroughly bracing climate, although until they have *somewhat recovered* their tone and vigour, an intermediate climate is that to be recommended.

5th Query. Pray state the advantage of mountain air on the health of British soldiers, although exposed to considerable hardships, and not provided with the usual and proper accommodation?

Ans. The above opinion might be illustrated by what took place in the 51st and 101st Regiments no later than last year. Both these corps were then at Rawul Pindee, previous to arrival at which station the former had suffered severely at Meean Meer, the latter at Mooltan. The men of both had steadily improved at Pindee, but up till June of last year their physical efficiency was by no means established. At that time it was proposed to send a working party of 200 men (a hundred from each corps) on the Abbottabad road. In the midst of rain and cold, with insufficient accommodation, but with good food and with every attention on the part of the Commanding and Medical Officers to the sanitary requirements of the force, as far as circumstances would permit, the men improved most remarkably in health and physical condition. They worked hard, had scarcely any sickness, and not a single death, and straight from this excellent physical training these men went with their regiment to form part of the frontier force under General Chamberlain, the previous weakly 101st bearing much of the brunt of that severe campaign. What would have been their condition if they had been brought straight from Mooltan to face the hardships, labour, and fatigue of the Umbeyla Pass? The corps would probably have been found an encumbrance only.

6th Query. Can you state the result of any experiment of the depôt or regimental detachment system in mountains—say 200 men per regiment?

Ans. It was proposed (and sanctioned by the Secretary of State for India) as far back as 1859 or 1860 to have (in addition to the small convalescent depôt) a depôt, or composite, battalion at Wellington, in the Neilgherries, but I cannot find that the idea (if considered practicable) has been carried out. This station of Wellington (or Jackatalla) was re-established about the time I left Madras in 1854, from which period till my return in 1860 it had (with the exception of a small convalescent depôt) been occupied by men of *one* corps—at first by a wing of the 74th, many of whom, I believe, were employed in the engineer department, building barracks, &c. I am not certain what corps relieved the 74th, but in June, 1860, on my arrival again at Madras, the 3rd Battalion 60th were stationed at Wellington.

I then understood, however, that no full corps was again to be sent there, such being the order of the Secretary of State for India.

In the beginning of 1862 the 60th went to Burmah, and, with the view, I presume, of carrying out as far as practicable the instructions of the Secretary of State for India, three companies of the 69th, just returned from Tonghoo, and three companies of the 105th, from Trichinopoly, were sent to Wellington. The 69th companies returned to Madras early in 1863, and since that date Wellington has been occupied by a *regiment*, to wit, by the head-quarters and 584 men of the 105th, the regiment furnishing a detachment to Trichinopoly. When the detachments of two corps (69th and 105th) were at Wellington they were not amalgamated. Each remained under their own officers, the senior officer merely commanding the station. Therefore, as regards Wellington, the composite battalion system, if it has not failed, has at all events not yet been tried, which, it appears to me, considering the orders of the Secretary of State, it would have been had the military authorities approved of the experiment, or considered that the proposed arrangement was likely to prove satisfactory.

The real way to utilize Wellington would be to have the head-quarters and a wing of two regiments always there, each corps furnishing another wing, one to Trichinopoly, and one to Cananore (both very trying stations as regards climate), and relieving the wings at these places by the others from Wellington every twelve months. A similar arrangement should exist as regards Bellary, the head-quarters of the regiment, should be at Ramandroog, with a detachment of 200 or 300 men (to be frequently relieved) at Bellary. In this way the injurious effects of the three most trying of the European stations in Madras would be greatly mitigated.

(Signed) G. S. BEATSON, M.D.,
Inspector-General of Hospitals.

MEMORANDUM ON CHERAT, PESHAWUR DIVISION, SUBMITTED TO HIS EXCELLENCY THE COMMANDER-IN-CHIEF.

By Inspector-General BEATSON, M.D.

IF Cherat is to be again occupied this year by a portion of the European force from Peshawur, it will be of the utmost importance in a sanitary point of view that some suitable shelter should be erected both for the sick and also for the healthy men.

Unless such shelter be provided the results of a residence there will not be satisfactory, which, under favourable circumstances, Dr. Beatson thinks they ought to be.

In tents, the climate in the hotter months is very trying, and when the weather is wet discomfort is added; while all the year round the diurnal alterations of temperature under canvas at such an elevation are, indeed must necessarily be, so great that bowel complaints at certain periods are prevalent, and occasionally severe.

In the circumstances under which Cherat has hitherto been occupied, it is not easy to arrive at a conclusion as to whether its elevation above the Peshawur Valley completely secures residents on the hill from the endemic fever so prevalent at Peshawur during the autumn. All men who have yet been sent to Cherat have for some time previously been in the valley, many of them up to a late period of the season, while they have all during their residence on the hill been subjected to the effects of the imperfect shelter afforded by tents.

If it is decided to occupy the hill again this year—proper shelter having been provided—it will be pointed out to the Medical Officer in charge how important it is that a careful report should be kept of the *antecedents* of all men who are seized with fever *on the* hill; whether they have lately come up from the valley, and whether they have before suffered from Peshawur or other malarious fever. This last is very important, as it is well known that comparatively slight causes will induce a return of fever in men whose systems have been previously imbued with the malarious diathesis.

The real test, however, of the comparative healthiness of Cherat and Peshawur would be to station on the hill during the autumn months a body of troops, not less than a company, and in no way picked men, of a regiment which had *not* served in the Peshawur Valley.

Having lately visited Cherat, and looked well over the spot, the Inspector-General believes it must prove healthier than Peshawur, and that, if the men are protected by suitable dwellings, it will prove a comparatively healthy residence for European soldiers. Its elevation is about 4,250 feet, it is a narrow spur dividing the Peshawur Valley from the Valley of Kohat and that of the Indus. Its height above these valleys ought to be sufficient to protect it from the effects of the malaria which during September, October, and part of November, steams up especially from the former; and that even the lower part, near the village of Sillikaun, is much more healthy that the Valley of Peshawur, is proved by the rapid improvement which took place in the health of the men of a Goorka regiment who were perfectly prostrated by fever at Peshawur last autumn, but who on removal to Sillikaun rapidly improved and were soon equal to the duties of active service in the field during the late campaign in the Umbeyla pass.

The general structure of the ridge seems to consist of loose friable slate with masses of mountain lime-stone, and here and there what seems to be veins of metamorphic sandstone. The sides of the hills at the top of the ridges are nearly bare rock, from which all the soil has been washed away.

There is one level spot of considerable size, probably not less than six acres, and another of about two. The former looks like the bed of an extinct crater which has been filled in in the course of ages by the soil from the surrounding rocks, on this spot there is (at the time of the Inspector-General's visit) a remarkable absence of vegetation, as there is also on the other level space which is higher up, under the hill on which the hospital tents were pitched last year. This second space has, Dr. Beatson understands, been lately more completely levelled and much improved, and at the lower part of it there is the evident commencement of a soldier's garden.

There is on the sides of the hills a considerable amount of space which, by terracing, might be available for huts, especially near the breast-work. On this locality, there were, Dr. Beatson understands, no tents pitched last season; probably, however, although there may have been military reasons against tents, there would not be the same objection to huts on this part of the ridge.

The number of men, however, which the hill or ridge of Cherat will accommodate must, the Inspector-General fears, be limited, as there are no indications of a large supply of water, which appears not only somewhat scanty, but almost the only source of sufficient supply is nearly two miles down the hill. The supplying any number of men on the top with a sufficient quantity of water—say even eight gallons per man per day—must, therefore, entail great labour and considerable expense. This, with other considerations of limited space, &c., induces Dr. Beatson to think that five to six hundred men would be the largest number that could be conveniently accommodated at Cherat.

The supply of fuel close at hand is also to all appearances scanty; but the climate up till November, after which the ridge would not be occupied, except by a small party to look after and protect the buildings, would scarcely demand more fuel than what would be required for culinary purposes; the question of fuel is, therefore, far less serious than that of water.

The temperature of Cherat (although past observations, owing to the absence of buildings, have made it appear somewhat high) must be very much lower than that of Peshawur, while from being a narrow isolated ridge it has the advantage of a free circulation of atmosphere. When the Inspector-General visited the hill in the middle of the day on the 24th of January there was a very marked difference between the temperature, as judged by the feelings, on the top and that of the lower country at the base of the ridge, and when coming down the hill at 3 p.m., there was found a pool of water of considerable extent frozen over to the thickness of nearly an inch and which it required some force to break.

As regards the style of buildings which would be most suitable, stone huts with mud roofs would probably answer well, while, with regard to size, the huts might be each for either eight or sixteen men, according as the ground or different parts of the hill might be found to answer. If for eight men, a hut 21 feet long by 18 feet wide, and 10½ feet high, would give 47 superficial feet, and about 490 cubic feet to each man, less than these measurements the men should not have, for although cooler than Peshawur, Cherat is not a temperate climate, and at some periods of the year must be warm. The huts for the larger number of men, sixteen, would be 42 feet long and of the same width and height as the others. The appurtenances for these buildings need not be elaborate, and as regards kitchens, as the rainfall is very moderate, and the cooking all done by natives, a simple shed with the back only built up would be ample.

A hospital, would of course be required, one large enough for 12 per cent. of the force on the hill, as sickly men would doubtless be sent up for change. The hospital, like the barracks, might be composed of several huts, allowing at least 800 cubic feet for each patient.

These buildings, as remarked by Deputy Inspector-General Macintire, might be constructed to last for, say three or four years; in that time the advantages or otherwise of occupying Cherat would be fairly tested; if satisfactory more permanent buildings could be erected, if not successful, no great sum of money will have been expended, not so much as the cost of tents would be in the same period.

As regards means for increasing the supply of water, pucka stone tanks seem the only means to be suggested, and as such tanks could only be expected to be filled by surface water, the *principle* one would necessarily require to be placed well down the hill; hence although the supply of water might be increased, the labour and expense of bringing it to the top must continue.

The question may now be asked, has Cherat sufficient advantages to justify all the necessary expenditure which it will require to make it a suitable residence for a portion of the European force in Peshawur during the period of the year when the latter is so notoriously unhealthy? The reply to this may, Dr. Beatson thinks safely be, that if a political necessity imposes on the Government the military occupation of the Peshawur Valley, the occupation of some less unhealthy spot than the cantonment of Peshawur becomes an object of the first importance, and if experience should prove that Cherat is even comparatively free from the evils which appear to be inseparable from a residence in the valley, then with all its disadvantages of scarce supply of water, confined limits, and its steep and and somewhat difficult approach, its occupation will be attended with well compensating results; for, in acknowledging its drawbacks, we must bear in mind that there is no other suitable locality which is British territory in the immediate neighbourhood of the Peshawur Valley.

During September, October, and November of every year, the European force in Peshawur becomes prostrated with fever, which prevails to such an extent that it may safely be said that for several months somewhere about thirty per cent. are unfit for duty, while of the remaining seventy per cent. a large number are quite unfit for any active service. In case of disturbances on the frontier, it does not require a man to be a soldier to see that an European force so circumstanced in the furthest outpost of our Indian Empire would be, in a military point of view, not only a source of weakness, but a source also of most serious and intense anxiety, and that therefore any measure which promises to secure to any portion of this force such an amount of health as would, in case of need, render that portion efficient is a matter of vital importance. That by the removal of a portion of the force from the valley to Cherat from May to November, the portion on the hill would be kept comparatively efficient, the Inspector-General quite believes, and at the same time the men would be so situated as to be available for service in the valley at the shortest notice.

As to the question of sanitary improvements ever making Peshawur healthy, Dr. Beatson confesses he is not sanguine enough to hope for this. It has been suggested that if the extensive jheel, north-west of the cantonment, were drained that malarious fever would be much diminished. That the drainage of this jheel, as being the part more immediately in contact with the cantonment, might somewhat improve the salubrity of the station is not unlikely, indeed is extremely probable, and hence, in a sanitary point of view, its drainage is to be recommended; but that the drainage of this portion (a drop in the bucket) will make Peshawur healthy, the Inspector-General cannot believe. The whole valley is more or less a jheel, surrounded by lofty mountains, which not only interrupt free circulation of the air, but produce absolute stagnation of atmosphere, so that there are not only malarious exhalations steaming from the surface, but the absence of currents of air concentrate and intensify these sources of disease which a more moving atmosphere would tend to dissipate and diffuse.

EXTRACTS FROM GENERAL ORDERS ISSUED BY HIS EXCELLENCY THE COMMANDER-IN-CHIEF IN INDIA.

From the Secretary to the Government of India, Military Department, to the Adjutant-General, No. 741, dated 23rd February, 1864.

The report of the Commissariat Commission having now been very carefully considered, I am directed to transmit copies of it, and to communicate, for the information of His Excellency the Commander-in-Chief, the views of the Government of India on the questions therein reported on, and the decisions arrived at on the various recommendations submitted by the Commission.

2. The Right Honourable the Governor-General in Council is confident that His Excellency will appreciate the care and pains which which the Commission have discharged their arduous and difficult duty—a duty which entailed much personal labour in sifting evidence, reconciling differences of opinion, and balancing the arguments brought forward—and that Sir Hugh Rose will fully concur with the Government of India in thinking that they have accomplished the work in a thoroughly efficient manner, and embodied the data so laboriously obtained, together with the result of their own experience, and the conclusions at which they have arrived, in a very complete and exhaustive Report.

3. His Excellency in Council cannot doubt that it will be a source of real satisfaction to the Commander-in-Chief, who has himself been so unremitting in his endeavours to improve the soldier's ration, to observe that, although it is not denied that improvements may be made, and in some respects are urgently needed, yet, on the whole, the Report bears a high testimony, after the fullest investigation, to the efficiency, zeal, and integrity of the Commissariat Department; and that it proves by undeniable testimony not only that the ration of the British soldier in this Presidency is quite sufficient, and indeed more ample than that provided for him in any other part of the British dominions, but also that the assertions which have been sometimes made that the health of the men has suffered from defect in the quantity and quality of the food supplied to

them, are wholly without foundation. The Cholera Commission, it may be remarked, had previously arrived at the very same conclusion in the course of their investigations.

4. The Governor-General in Council approves of the measures recommended by the Commission, with the exceptions and modifications hereafter noted; and copies of the Report, with the decisions of Government appended, will be furnished to the Commissariat and other departments concerned in the provision of any of the supplies, &c., therein referred to, with an intimation that the two together may be used as a text book for their information and guidance, and that the views of the Commission may be acted on when they are not at variance with the letter or spirit of these instructions. By this course much unnecessary discussion and references to Government may probably be avoided. Copies will also be supplied for distribution, under the orders of His Excellency the Commander-in-Chief, to officers commanding divisions and stations in which European troops are located, with an intimation to the same effect; and reprints of the Report, with the orders of Government attached, but without the Appendix, will be sent to the Adjutant-General's Office at the Presidency, for distribution to officers commanding European regiments, &c., on receipt of a statement showing the number of copies which will be required for this purpose. The complete Report would have been furnished to all, but the number of copies struck off is too limited to admit of it. A few copies will, moreover, be sent for the information of the Governments and Commanders-in-Chief of Fort St. George and Bombay.

6. The recommendations of the Commission, modified as above indicated, are as follows:—

Contracts.

I. That, as a rule, the contract system (under certain provisoes) should obtain for all articles of supply except bread.

Extent and periods of Contracts.

II. That contracts, though open to all, whether residents or not, be for stations only, and for one year for all articles except meat, the contract for which should be for three years.

III. That the time of year for entering on new contracts be fixed by the Commissary-General, with due consideration to the periods of prospective harvests.

Various rates of Supply in and out of Cantonments.

IV. That two intermediate rates, between "cantonment" and "command" rates be established to meet the contingency of short moves of troops. (Para. 47 of the Report.)

Contract Deeds and Abstracts of them.

V. That, though the contract deeds must be drawn out in such a form as to be legally binding, a brief abstract be made of each contract, showing clearly the terms of the supply; and that printed copies of these abstracts be made available for the commissariat officers, as well as for officers commanding stations, regiments, and detachments.

The Executive Commissariat Officer responsible for the quality of the Rations.

VI. That Executive Commissariat Officers be held strictly responsible for the quality of the rations issued to the troops supplied under their supervision (see para. 50 of the Report), and that they be required to inspect the rations as often as possible before tender at the ration stands.

Fair Rates to be paid for Meat.

VII. That fair and remunerative rates be paid for meat, and that competition in rates be not pushed too far. This will be effected directly in some measure by the more stringent conditions which may be imposed on contractors,* and indirectly by the judicious exercise by the Commissariat Department of its discretion in accepting tenders,* and by ration committees of their power of rejecting what is tendered.

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* See paragraphs 13 and 14.

Mutton.

VIII. That higher rates be paid for mutton, and that the contractors be encouraged to improve its quality. The remarks made on the last recommendation apply equally to this one; and certain measures for improving the quality of meat, which are under consideration, will be noticed below.†

Brood Stock to be protected.

IX. That in order to avoid undue pressure on the supply of mutton, the latter be issued once a week only, until the supply increases sufficiently to enable the Commissary-General to recommend more frequent issues; and that, to prevent the destruction of the brood stock, not more than ($\frac{1}{3}$) one-third of the sheep killed for rations be ewes.

Exchange of meat not allowed—Circumstances under which condemned meat may be issued.

X. That the option of exchanging meat be no longer allowed; but, in order to prevent the inconvenience to which the soldier is subjected by the condemnation of the meat ration in places where no good substitute can be procured, the officer commanding the station may use his discretion in allowing the condemned ration to be issued, should the officer commanding the corps or detachment, with the concurrence of the medical officer, desire it. In that case, if the Executive Commissariat Officer considers that there are no grounds for appealing to a special committee, or if the latter, on being appealed to, upholds the award of the regimental committee, the full amount of the fine will be levied from the contractor, and credited to Government to aid in meeting the expense which will be incurred for compensation paid under Rule XXX below.

Bread.

XI. That bread be prepared by direct Commissariat agency, as soon as arrangements can be made for that purpose; and that hop and potato yeast be susbtituted for toddy juice and artificial barm as soon as possible.

Dough-making Machines.

XII. That Stevens' patent dough-making machines, driven by bullock gear motive power, be used in all Government bakeries.

XIII. That, on occasions of condemnations of bread, the flour or soojee ordered as a substitute be issued in a kneaded state, unless the commanding officer intimates that this is not desired.

Size of Loaves.

XIV. That quartern or half-quartern loaves be issued in lieu of the present pound loaf.

Bread to be made not of Soojee, but of Flour.

XV. That as soon as measures can be taken to have country flour properly prepared, it be used, instead of soojee, for making bread.

Mills for preparing the Flour.

XVI. That two of Bovill's patent blast mills, of the size and description given in para. 159 of the Report, be established, one at Lahore, the other at Cawnpore, for the preparation of flour for making bread. These, the Governor General in Council thinks, will be sufficient for commencing the experiment.

Bakeries and Slaughter-houses.

XVII. That Government bakeries and slaughter-houses be built in all stations where European troops are permanently located.

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* See paragraph 51 of the report.

† See paragraphs 13–15.

Substitution of Flour for Rice.

XVIII. That an equal quantity of flour be substituted for the present ration of rice, at the option of the soldier, whose choice must be made for fixed periods of not less than 15 days.

Tea.

XIX. That the ration of green tea be done away with, and a full ration of black tea substituted. This decision, however, will not, of course, interfere wit the progress of the experiments now being made to ascertain whether teas of Indian growth, mixed with China tea when necessary, which in many instances have been highly approved of by the men, can be advantageously issued to the soldier or not.

Salt.

XX. That the present ration (1 oz.) of salt be reduced to two-thirds of an ounce; but that the existing scale of rations be in other respects unaltered.

Coffee and Tea in the early morning, &c.

XXI. That arrangements be made, in connection with regimental canteens, for the preparation and issue of a morning cup of coffee or tea.

XXII. That good iron coffee-roasters, and large sized grinding-machines under Nye's patent, be supplied by Government.

XXIII. That tea and coffee pots be supplied by Government for the men's messes.

XXIV. That precautions against the pilfering of tea, coffee, &c., by native coolies be at once adopted.

Groceries.

XXV. That, as recommended in paras. 222-3 of the Report, a supply of groceries for 15 days be stored in advance, for the *quality* of which, after survey and acceptance, the contractors' responsibility will cease; and that these stores be kept under double lock.

Vegetables.

XXVI. That the cultivation of vegetables, of the potato especially, be encouraged in every way, by the issue of seeds gratis, the establishment of fairs, prizes, &c., as suggested in paras. 206, 207 and 219 of the Report.

This recommendation will be further noticed below.*

Potatoes.

XXVII. That contracts for potatoes be separate from those for other vegetables.

Extra Messing—Temporary Bazars.

XXVIII. That an uniform system of "extra messing" be encouraged amongst the troops, and that facilities be afforded to all for purchasing such extra articles of rations as they may require from the Commissariat department, as recommended in paras. 243-54 of the Report. The establishment and proper regulation of "extra messing"—as also the temporary bazaars recommended in paras. 255-6, which should, in the opinion of Government, be encouraged—must of course rest mainly with commanding officers of regiments acting under the orders of His Excellency the Commander-in-Chief. But the Commissariat Department will be required to afford every assistance in its power.

Samples of Rations to be selected.

XXIX. That, in order to establish as a standard a *wholesome*, rather than an unnecessarily superior, quality of rations, samples of such articles as can be so preserved be chosen by select committees of experienced officers, and enclosed by them in stoppered bottles, which should be kept both in commissariat offices and at ration stands.

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* See paragraphs 16–18.

Committees on Rations.

XXX. That, as at present, the decision of regimental committees on rations be final and absolute as regards the soldier; but the Executive Commissariat Officer will retain the right now possessed by him of appealing to a special committee, to be convened by the officer commanding the station, of selected officers, who shall record their opinion whether the fine shall be enforced or remitted, and whether compensation for the cost of the rejected rations (if these should not be issued) should be allowed to the contractor or not.

Scales and Weights.

XXXI. That English scales and weights be universally adopted, and steelyards be never used at the ration stands.

Bakeries and Slaughter-houses to be visited.

XXXII. That bakeries and slaughter-houses be visited periodically—at least once a fortnight—by the sanitary officer, and that they be open at all times for the inspection of officers commanding stations or corps. Whilst sanctioning this recommendation, the Governor-General in Council observes that, if the commissariat officer does his duty, the interference of the sanitary officer will not be needed.

Station Butchers.

XXXIII. That the appointment of a station butcher, in every station at which one European regiment or more is located, as originally sanctioned by Government General Order, dated 25th October, 1822, but abolished by Government General Order, No. 714, dated 9th September, 1853, be revived, wherever a thoroughly qualified non-commissioned officer or soldier is on the spot and available for the work. His duties will be those laid down in the General Order of 1822, above referred to, and in para. 287 of the Commission's Report.

Government Farms not desirable.

XXXIV. That Government should not connect itself directly with farms of any kind, large or small.

The Governor-General in Council concurs in the opinion of the Commission on this point, and does not consider that the principle involved should be departed from by the establishment by Government of piggeries, as recommended in paras. 124–26 of the Report. If piggeries are desired, they should, His Excellency in Council observes, be managed under regimental arrangements. But the Commissariat Department will be instructed to give every encouragement in its power to pensioners and others who may be willing to start farms on their own account, by the purchase of their farm produce when required for the sick. (See para. 284.)

Variety in the Soldier's Food and Cooking.

XXXV. That steps be taken to secure variety in the food of the soldiers, and greater attention to the mode in which their meals are served up; and that the men's messes be placed on a more becoming footing. (Report, paras. 300–305.)

It may be noticed that the substitution for a portion of the soldier's meat ration, of an equivalent (in value) of bread, when the commanding officer and medical officer may deem such alteration in diet advisable, and the commissariat officer may be able to arrange for the exchange without extra expense to the State, was authorized in letter, No. 334, dated 11th July, 1863; and the same course may be adopted with other articles of rations in similar circumstances, when it can be arranged without extra expense.

Hours of Meals.

XXXV. That such modifications be made in the hours of the soldier's meals as His Excellency the Commander-in-Chief may deem advisable. (Report, paras. 306-7.)

Cooking and Cook-houses.

XXXVII. That the soldier's food be cooked under European superintendence, that cook-houses of a standard pattern be erected and fitted with all requisite appliances; that a cook-sergeant be appointed; and that the Native cooks be borne on the rolls of regimental establishments as Government servants,—a better class of men than are now employed being obtained by holding out to them the prospect of small pensions when invalided or after lengthened service. This recommendation will be presently adverted to.[*]

Some recommendations of the Commission not adopted.

7. It will be observed that Government has not thought it expedient to adopt some few of the recommendations of the Commission. It is, for instance, considered better to allow tea and coffee to be issued as at present, instead of tea[†] on two days and coffee on the third; the establishment of a Government garden at Peshawur[‡] for the purpose of *raising acclimatized seeds* seems of doubtful expediency, and their importation either from Europe or the Cape, annually, or every second or third year, as may be found necessary, would appear preferable; a trial of Major Macbean's plan[§] to establish a permanent station committee to inspect rations seems unnecessary, as the scheme offers no peculiar advantages; and the recommendation that payments[||] should be made to original contractors only, and not to their agents, in order to prevent sub-letting, would not, in the opinion of Government effect that purpose, whilst it would lead to a great deal of inconvenience and trouble, probably to oppression also, and would certainly deter many from tendering.

Improvement already affected by His Excellency the Commander-in-Chief.

8. The Governor-General in Council observes that the orders issued by His Excellency the Commander-in-Chief, in the Adjutant-General's Circular, dated 13th June, 1863, struck at the root of many of the more serious evils which some of the recommendations[¶] of the commission were designed to prevent; and they have doubtless already effected much improvement in economising the rations and turning them to the best account by proper cooking, in ensuring more regularity, cleanliness, and order in messing arrangements, &c.; still more may, however, be effected when the increased appliances and improved cook-rooms now authorized can be provided.

Style of Cook-house and Apparatus really required.

9. The elaborate apparatus and style of building suggested, though not distinctly recommended in the body of the Report (para. 294) appear to Government to be too extravagant and not to be required; and there can be no doubt that a sufficiently large, well-ventilated and well-lighted building, with a good fireplace, boiler, oven, ordinary dressers and tables, arrangements for a plentiful supply of water and for drainage, and proper receptacles for receiving refuse matter, would be not only sufficient, but *best suited* for soldiers, who can carry into the field the simplest utensils only.

A Pantry to be added.

In such a cook-room the present cooking utensils, supplemented by a few additional ones, could be used; and if to the cook-room be added a pantry, with wire gauze screens to the windows, in which to lock up the rations during the intervals between meals, every real requisite will, it is believed, have been then supplied; and the rest will depend on those good regimental arrangements for supervision and management, without which the most costly apparatus is useless, whilst with it even very inferior appliances are found sufficient.

Grant's and Duff's Cooking Stoves.

10. The introduction of any of the cooking stoves and ranges ("Grant's" "Duff's," and others) which have been proposed, as noticed in the Report, does

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[*] See paragraphs 9–12.

[†] Report, paragraph 194, recommendation 19.

[‡] Ditto, paragraph 218, recommendation 29.

[§] Ditto, paragraphs 71, 72, recommendation 35.

[||] Ditto, paragraph 79, recommendation 38.

[¶] Nos. XXI, XXIV, XXVIII, XXXV, and XXXVII, above.

not appear to Government to be advisable, for the present at all events, both for the reasons adverted to in the last paragraph, and because actual experience has not yet satisfactorily established the practical suitability of the contrivances for the purpose they are intended to answer.

Plans of improved Cook-houses will be prepared.

11. Designs for such a cook-house and pantry as have been above described will be prepared in the Public Works Department, in direct communication with the Quartermaster-General's Department; and the Governor-General in Council will be glad of an expression of Sir Hugh Rose's views as to the additional cooking utensils and furniture which His Excellency may deem necessary, in accordance with the foregoing intimation of the intentions of Government. An estimate of the probable cost, and the periods for which the articles should be required respectively to last, with a statement showing what articles have been already authorized, should be submitted at the same time.

Cook Sergeants.—Status of the Native Cooks.

12. His Excellency's opinion is also solicited with respect to the expediency of making applicable to this country the General Order No. 828, dated Horse Guards, 13th July, 1863, publishing certain regulations for establishing an efficient system of military cooking in the army; and also as to the advisability of recommending to Her Majesty's Government the suggestion of the Commission that the native cooks should be Government servants, and that deductions should be made from the soldiers' pay, as for rations, to meet the expense of their salaries. Should Sir Hugh Rose prefer the course suggested to that of leaving the men to be engaged and managed as they are at present, altogether as private servants, I am to request that His Excellency may be moved to state what establishment of cooks should be maintained, what pay, &c., should be given, and what deductions should be made from the men's pay.

Measures for improving the quality of the Meat.—Fodder, Water, and Salt.—Report, paragraph 286.

13. Referring now to Clause VIII of paragraph 6 above, I am to acquaint you, for His Excellency's information, that contractors will be required by all future contracts to supply the cattle and sheep with abundance of water, to increase the quantity of bhoosa, from 5 and 1½ seers respectively, to 7 seers a day to each head of cattle, and 2 seers a day to each sheep (other fodder being increased in the same proportion when given instead of bhoosa), whenever the grazing is scanty or the grass watery and deficient in nutriment, and to keep large lumps of rock salt in every cattle-yard and pasture. This will be in addition to the quantity of salt which is now given to the animals in their food; the mixture of the powdered salt with the bhoosa, though very necessary, being no sufficient guarantee that each receives it regularly and in sufficient quantity.

Contractors' Grazing Grounds.

14. I am further to state that inquiries are now in progress as to the possibility of requiring contractors to secure proper grazing grounds in the neighbourhood of the stations which they have to supply, and of affording them facilities of renting such grounds on moderate terms.

Cattle Fairs.—Improvement of the Breed of Cattle.

15. The cattle fairs, shows, and prizes for cattle, recommended in paragraph 277 of the report, have already been commenced by the various local Governments with marked success; and it does not appear necessary to do any thing more than encourage the endeavours of the Commissary-General, [whose attention has been already drawn to the subject, to improve the breed of sheep by the gradual importation of English rams, two of which have recently been purchased here, for crossing with ewes to be selected for the purpose by the Superintendent of the Hissar Cattle Farm. Lieutenant-Colonel Scott's views on this subject are already before the Commander-in-Chief in the letter, copy of which was transmitted for His Excellency's information, with one from this office, No. 724, dated 25th January, 1864. The proposals in that letter will be further considered by Government hereafter.

Supply of Vegetables.—Report, paragraphs 199–220.

16. With respect to the supply of vegetables, the Governor-General in Council considers that convict labour in the gaols may be usefully and unobjectionably applied, and it has the advantage of the supervision of European officers who can bring their special knowledge to bear on the subject as regards mode of culture, the time of planting and sowing, the best kinds of seeds, &c., &c. The Commissary-General will, therefore, be instructed to arrange, if possible, for the purchase of such supplies of vegetables as the gaols can guarantee to furnish, in so far as it can be done without injustice to contractors or risk of failure in the supply.

Descriptions to be Cultivated.

17. His Excellency in Council considers the suggestion in paragraph 219 of the Report, that encouragement should be given to cultivate vegetables of those descriptions only of which the soldiers approve, a judicious one; and the Commissary-General will be desired to cause a list of such vegetables to be drawn out in communication with the Adjutant-General's department.

Best means of encouraging the Cultivation.

18. He will also be instructed to submit, with as little delay as possible, distinct proposals for the encouragement to be given to cultivators in accordance with the general recommendations of the Commission in paragraph 206 of the Report, which are fully approved by Government. It may, however, not be out of place to remark, that the increased demand for vegetables has already produced, and may be expected to continue to produce, a steadily increasing supply; and some statements recently forwarded for His Excellency's information will have shown the Commander-in-Chief that, in spite of many difficulties, considerable progress has been made in extending the periods during which potatoes can be issued to the troops. The Commissary-General is well aware of the importance which Government attaches to the efforts of the department in this direction, and its endeavours will not be allowed to slacken.

Increase of the Commissariat Department not necessary at present.

19. The question of increasing the commissioned staff of the Commissariat Department, which the Commission evidently considers in itself desirable, will, the Governor-General in Council remarks, require very serious consideration, and Government is not prepared to entertain the suggestion immediately; especially as the proved abuses appeared to be few, and the working of the department, already satisfactory, may be expected to become much more so through the operation of the measures now sanctioned. But the question of improving the condition of the subordinate grades of the department, and rendering them more thoroughly efficient, is under the consideration of Government; and the Commissary-General will be requested to cause particular attention to be paid to the recommendations of the Commission* respecting the selection of subordinates for the executive charge of out-posts.

Necessity of cordial co-operation on the part of Commissariat and Regimental Officers.

20. In conclusion, the Governor-General in Council desires to impress on both commissariat and regimental officers, the paramount importance of mutual hearty co-operation in their endeavours to secure proper rations for the soldier, and of repressing to the utmost the tendency to antagonism which there is always more or less reason to apprehend when individuals or classes are associated for the attainment of an object which they contemplate from opposite points of view. Such antagonism must invariably be prejudicial to the interests alike of the soldier and of the state, and cannot be too strongly deprecated; whilst the experience of long course of years shows that it can be with no great difficulty avoided. A readiness heartily to co-operate in the discharge of public duty, irrespective of personal or private considerations, Government confidently expects from all its officers.

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* Report, paragraph 332.

Head-quarters, Simla, 21st June, 1864.

With the sanction of Government, the Commander-in-Chief in India pleased to direct that, with the exceptions stated, the issue of rum from canteens is for the future to be restricted to one dram per man per day, from the 1st of July next.

1stly.—When a regiment takes the field two drams may be issued, should the commanding and medical officers consider it desirable.

2ndly.—Two drams may also be issued during the prevalence of epidemics, or in special individual cases, if deemed advisable by the medical and commanding officers.

Sir Hugh Rose has taken into mature consideration the opinion, an unanimous one, of medical officers, that it is prejudicial to the health of the soldier, especially in a tropical climate, to drink daily two drams of spirits.

They consider that this constant consumption of ardent spirits weakens gradually the organs of life, affects the head, excites the senses, and paves the way to crime.

His Excellency is persuaded that many young soldiers, sober from childhood, have contracted habits of inebriety from drinking at the canteen what they conceive to be a regulation allowance of spirits for soldiers.

The soldiers have now at their disposal, and they freely use them, every description of manly games, useful employment and recreation, with well supplied refreshment rooms.

Sir Hugh Rose has at heart the soldier's welfare, and he entertains the conviction that such occupations of their leisure hours is better for their health and happiness than stimulants, which never lead to good, and are too often the heralds of soldiers' errors and misfortunes.

By order of His Excellency the Commander-in-Chief,
E. Haythorne, Colonel, Adjutant-General.

Rations.

Memorandum.

Adjutant-General's Office,
Head-quarters, Camp, Meerut, 16th December, 1864.

The Commander-in-Chief in India having taken into consideration the advisability of altering the hours at which the soldiers' meals are served in this country, is pleased to direct that the following changes, recommended by a medical board of which the Inspector-General of Hospitals, Her Majesty's British Forces, was President, shall be adopted and observed hereafter:

Breakfast	8½ A.M.	Throughout the year.
Dinner	2½ P.M.	
Tea immediately after the evening parade		

2. Regimental arrangements are to be made in order to secure to every man a cup of tea or coffee, with a biscuit if practicable, or slice of bread, in the early morning, before turning out for parade. As the expense of this meal is borne by the soldier, it must be considered voluntary.

3. Medical authorities are of opinion that sleeping after meals is injurious, but that repose for two hours in the forenoon, during the hot season, and before dinner, is conducive to health and comfort, more especially to regiments in the plains.

This system of repose has been found to work favourably in the Mediterranean stations.

The Commander-in-Chief in India, therefore, directs that during the hot season the men be permitted to make down their beds between the hours of 11 A.M. and 1½ P.M. daily, to which period the arrangement must be exclusively restricted.

4. The issue of beer or spirits previous to the dinner hour is considered by the medical authorities to be injurious, and is therefore prohibited; and those men who take beer should be encouraged to drink a portion of their allowance with the dinner meal.

By Order,
E. Haythorne, Colonel, Adjutant-General.

REPORT ON HYGIENE FOR THE YEAR 1864.

By E. A. Parkes, M.D., F.R.S., Professor of Hygiene in the Army Medical School.

This Report, as explained in former years, is merely intended to bring together in a short form the new facts or discussions on hygienic subjects which are interesting to Army Surgeons, or which may show them in what direction the subject is advancing. It is not intended as a complete record, but merely as an epitome and selection.

The following is the order of arrangement :—

I. Enumeration of Works on Military Hygiene.
II. General Hygienic Conditions.
    Air and ventilation.
    Water.
    Food.
    Soils.
    Removal of excreta.
    Exercise.
    Statistical enquiries.
III. Soldiers.
    Salubrity of military hospitals.

I. Works on Military Hygiene.

The "Hygiene of the Army in India"* is the title of an able treatise by Mr. Stewart Clark. It is divided into 11 chapters, on air and ventilation, water, food, conservancy, drainage, supervision, barracks, prisons. There are many interesting and important observations in this work, to some of which we shall have to refer.

The United States' Sanitary Commission have published, among other works, a volume of Military Medical Essays† on most of the subjects interesting to Army Surgeons, such as the prevention of infectious diseases, of malaria, of scurvy, of small-pox, the treatment of typhus, dysentery, of hœmorrhage from wounds, and of fractures, on amputations, excisions of joints, and on syphilis. The essays are very different in merit, and some are mere compilations of well-known facts; others are more original, but few contain as many illustrations from the experience of the present war as might be expected.

Dr. Chenu has published an elaborate Report‡ on the Medico-chirurgical History of the French Army in the Crimea, in which the mortality and sickness are for the first time fully given.

In the works on Military Surgery by Dr. Neudörfer§ and by Pirogoff‖ various sanitary points are more or less fully discussed, of which notice will be taken in the proper places.

The Report of the Indian Sanitary Commission has naturally given rise to much discussion. The facts, or rather the inferences, drawn from them have been questioned, and the propriety especially of applying the average death rate drawn from a long term of years as a measure of the present mortality, has been warmly criticised; but as all these reports and essays are familiar to most Army Surgeons, it is unnecessary to discuss them.¶

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* Practical Observations on the Hygiene of the Army in India. By Stewart Clark, M.R.C.S. Eng., Inspector-General of Prisons, North West Provinces.

† Military Medical and Surgical Essays, prepared for the United States' Sanitary Commission. Edited by William A. Hammond, Surgeon-General.

‡ Rapport au Conseil de Santé des Armées, Paris, 1865.

§ Handbuch der Kriegs-Chirurgie, von D. J. Neudörfer.

‖ Grundzüge der allgemeinen Kriegs-Chirurgie, von N. Pirogoff. Leipzig, 1864.

¶ I take this opportunity of requesting the Secretaries of the different Sanitary Commissions in India to be so good as to send me the Reports or Minutes which they print for circulation. They are not readily procurable in this country, and it is

AIR AND VENTILATION.

The Air of Mines.—The most important addition during the year to our knowledge of the composition of the air is contained in the Appendix (B) to the Report of the Commissioners appointed to inquire into the condition of some of the mines in Great Britain.* The air was examined by Drs. Taylor, Angus Smith, and Bernays. The report of Angus Smith is especially full, and forms, indeed, a complete treatise on the subject. The reports of Drs. Bernays and Taylor also contain many important facts.

Angus Smith's experiments were chiefly made in the metalliferous mines in Cornwall, and were directed to ascertain the amount of oxygen, carbonic acid, organic water, and the substances added by the blasting.

The life of the Cornish miner is an insecure one, and at twenty years of age he pays a premium nearly 37 per cent. higher than that of a healthy man in the rural districts. This is owing in part to the vitiated air. Lung diseases are extremely common.†

Previous observers had noticed a diminution in the amount of oxygen, amounting sometimes to a loss of 2, or even 4 per cent., and an increase in carbonic acid. Smith's observations are confirmatory. Out of 399 experiments in only 10·67 per cent. was the oxygen in normal amount (20·9 per cent.); in all the rest it was in lessened quantity, down to 20·5 per cent.

In the different parts of the mine the oxygen was as follows:—

General average	20·26
Of ends	20·18
Of other parts	20·32
In currents	20·65
In large cavities	20·77
Just under shafts	20·424
In sumps	20·14

The carbonic acid was increased enormously, amounting, on an average, to 0·785 per cent. (7·85 per 1000 volumes). Respiration and combustion account for these results. But, in addition, the air of mines may contain numerous substances derived from the blasting, viz., carbonic acid and oxide, hydrogen, sulphide of hydrogen, and various salts, which are suspended, such as sulphate of potash (in large quantity), carbonate of potash (in large quantity), hyposulphite of potash, sulphide of potassium (which passes soon into sulphate of potash), sulphocyanide of potassium, nitrate of potash, carbon, sulphur, and sesquicarbonate of ammonia. Supposing that 12 ounces of powder have exploded into a space of 1,200 cubic feet, Dr. Smith found that no less than 3 grains of solids were diffused in each cubic foot, or 3,600 grains in the 1,200 cubic feet. A man must inhale a large quantity of this into his lungs. The oxygen of the air is not lessened, however, in the ratio of the amount of these substances.

Organic matter is also present, and Smith obtained some of it from the

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extremely important to have a complete series in the library of the Army Medical School at Netley. In last year's Report, reference was made to a work called "Annals of Military and Naval Surgery," which was compiled by Dr. Alexander Grant, of the Bengal Medical Service, and which was intended as a summary and digest of all military and naval medical essays and works. It is understood that this useful book will not be continued, owing to the pecuniary loss its publication caused to its author. This is greatly to be regretted, for few more useful books have been lately printed, and, possibly, if a number of army surgeons could be induced to subscribe to the work and to undertake to buy one copy each annually for five years, it might be possible to raise money enough to continue the publication for that time. It is understood that the talented editor is willing to give both time and labour to the work, and it is but right he should be secured against pecuniary loss.

* Blue Book with Minutes, Epitome of Evidence, and Appendix. (The mines were those of Cornwall, Devon, and the lead mines of Yorkshire and the northern counties.)

† In these blue books are contained some excellent reports on the health of miners by Dr. Peacock and Mr. Bankart; and also statistical tables prepared by Dr. Farr.

tubes in which the air was collected. When burnt it had the unmistakeable odour of nitrogenous substances, like burnt feathers, and left carbon behind.

As a rule, it would appear that sulphuretted hydrogen is not common in the air of metalliferous mines apart from blasting.

Dr. Angus Smith has made a number of experiments on the amount of oxygen under different circumstances, which it may be useful to give:—

	Percentage of Oxygen.
In a suburb of Manchester in wet weather	20·98
do. do.	20·96
In the outer circle of Manchester	20·947
At the back of the house	20·936
In fog and frost in Manchester	20·91
In sitting-room which felt close, but not excessively so	20·89
In a small room with petroleum lamp, well ventilated	20·84
Do. after six hours	20·83
Pit of Theatre, 11·30 p.m.	20·74
Gallery, do., 10·30 p.m.	20·36
In large cavities in mines	20·77
In currents	20·65
Under shafts	20·424
In sumps	20·14
When candles go out	18·5
The worst specimen yet examined in the mine	18·27
Very difficult to remain in for many minutes	17·2

The lessening of oxygen in mines is thus plain.

Dr. Bernays' experiments were conducted in Derbyshire, Cumberland, and Cornwall. His attention was particularly directed to the amount of carbonic acid, organic matters, and floating particles of carbon, which he thinks are often derived merely from the extremely bad candles used by miners. The carbonic acid was, of course, found to vary extremely, in accordance with the amount of ventilation; in the galleries of well-ventilated mines it was not more than normal amount (0·04 per cent.), while in the ends and "rises" it was sometimes enormously increased. Unless there is some error, one of the samples of air contained no less than 2·238 per cent. of carbonic acid in volume.*

Dr. Bernays also collected the organic matter by condensing the moisture of the atmosphere by ice. In well-ventilated mines scarcely any organic matter was found; in others, a large quantity.

After blasting in some mines, some arsenical compound was in the air, and was easily detected by a garlic odour.

The result of all these elaborate inquiries may be briefly summed up.

The air of mines differs greatly, according to the amount of blasting, the kind of candles, and the method of ventilation.

1. In badly-ventilated mines the oxygen is lessened; carbonic acid takes its place; organic matter is present. No other gases have been detected, apart from blasting.
2. Blasting by gunpowder adds gases (especially S H) and solid particles (partly in crystalline form) of different salts, especially sulphate of potash, formed from sulphide of potassium. Other processes—boring striking—cause particles of dust, rock, &c., to float about.
3. The bad candles add not unfrequently large quantities of particles of carbon.
4. There is increased barometic pressure (even to the extent of 1 to 1½ inches of mercury), heightened temperature, and increased moisture of the air.

Such being the chemical conditions, the question may be thus put—

The miner's life in these metalliferous mines being an unhealthy one, especially from lung diseases,* and it being assumed that bad air is one great cause of it, what are the conditions of air enumerated above which are hurtful?

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* Brenfield Lead Mine. Appendix B, p. 288. This extraordinary amount of 22·38 volumes per 1,000, must surely be owing to the air having been collected after blasting, or to especial deficiency in ventilation.

Ad. 1.—The injurious result can hardly be from lessened oxygen, though Dr. A. Smith seems to attach some weight to this. The diminution is, on the whole, inconsiderable. All the experiments made on men and animals seem to show that till the oxygen falls very low there is no fear of any decreased absorption power on the part of the blood.

The effects of excess of carbonic acid leads us to the old question, even yet not solved, as to the influence carbonic acid, *per se*, has upon health when it is in quantities insufficient to produce decided symptoms of poisoning, and insufficient, also, to offer any great obstacle to the outflow of the carbonic acid of the blood.

In a soda water manufactory Dr. Angus Smith found† the amount of carbonic acid to be 0·19 per cent. (nearly 2 volumes per 1,000), and yet the air was fresh and agreeable, and produced no bad effects on the workmen. It may then be considered certain that in moving air, in which the only impurity is carbonic acid, this amount produces no very obvious effects. But the average in mines was ·785 per cent., or nearly four times the amount in the soda-water manufactory. What effect will this produce?

In mines and rooms it is impossible to isolate the effect of the carbonic acid from the organic matter of respiration and other impurities, so that special experiments are necessary.

Dr Smith constructed a leaden chamber, of about 170 cubic feet capacity, and in this he introduced carbonic acid in determinate quantities. The effect of the carbonic acid when in large quantities (but not enough to cause marked poisonous effect) was to lower the force and frequency (usually) of the heart's action, and to increase the number of respirations, which became sometimes difficult and gasping.

An amount equal to 3 per cent. of CO_2 at once had this effect, and it was slightly perceptible with an amount so low as 0·1 per cent.‡ On going into fresh air these effects rapidly passed off.

If these experiments are confirmed they may show that we have underrated the effect of carbonic acid, and at any rate the average in mines of nearly 0·8 per cent. could hardly be without some influence on health. But it is probable that to the organic matter in mines a larger effect must be attributed than to the carbonic acid, a fact shown by the circumstance that while 0·2 per cent. of carbonic acid is borne readily if the acid is liberated by chemical action, 0·1 is very distressing to many persons if it is liberated by respiration; in other words, if organic matter is also present.

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* The following Table, supplied by the Registrar-General, to the Report, will show the extent to which these men suffer from lung diseases:—

AVERAGE Annual Deaths per 1,000 from Pulmonary Diseases during the Years 1860–62, inclusive.

Ages.	Metal Miners in Cornwall.	Metal Miners in Yorkshire.	Metal Miners in Wales.	Males exclusive of Miners in Yorkshire.
Between 15 and 25 years	3·77	3·40	3·02	3·97
„ 25 „ 35 „	4·15	6·40	4·19	5·15
„ 35 „ 45 „	7·89	11·76	10·62	3·52
„ 45 „ 55 „	19·75	23·18	14·71	5·21
„ 55 „ 65 „	43·29	41·47	35·31	7·22
„ 65 „ 75 „	45·04	53·69	48·31	17·44

The deaths from pulmonary diseases in Wales, exclusive of miners in Cornwall, is a little less than in Yorkshire. In Wales it is a little more, but still is fairly represented by the Yorkshire rate. The enormous increase among the miners from the age of 35 to 65 is evident at a glance.

† Report on Mines. Appendix B, p. 234.

‡ Chemical News, February 17th, 1865.

In mines the presence of organic matter is certain, but its amount is quite unknown. Dr. Smith has attempted to estimate it, but the result was not satisfactory. The method by the permanganate does not well apply to mines, in which products of blasting are often present (sulphurous acid, sulphuretted hydrogen). The smell of the organic matter when examined at a distance from the mines was found to be a compound of the smell of tallow, perspiration, and tobacco. There was also a peculiar aromatic odour, like that of apples, which is, it appears, known to be a common smell in ill-ventilated places.*

It cannot be doubted that this organic matter, putrifying as it is, must be very injurious. Although its re-entrance into the body through the delicate membrane of the air cells has never been chemically proved, and probably never can be proved, the effects produced by it are sufficient evidence not only of its absorption, but that like most of these putrefying organic matters, it selects the nervous tissues as the structures with which it combines.

Ad. 2.—Of the substances added by blasting the sulphuretted hydrogen and the sulphide of potassium, carbonic acid and carbonic oxide would act chemically, and all the other substances would probably act mechanically. The sudden asphyxiating effects which sometimes occur, are usually ascribed to SH, but possibly carbonic oxide may have something to do with it. But these gases produce known symptoms. They do not probably produce the lung diseases; it is more likely that the solid particles given off by blasting and boring have more to do in this direction.

Ad. 3.—Dr. Bernays especially is inclined to believe that a large quantity of solid particles of carbon are added by bad candles with large and partly consumed wicks.

Ad. 4.—It does not seem likely that either the increased barometric pressure or the increased humidity of the air have any influence, except perhaps indirectly, for it is believed that an atmosphere at once heavy, moist, and hot, has an enervating effect. The sudden changes of temperature on entering and leaving the mine have, it has been supposed, some share in causing the excessive amount of lung disease.

Summing up then the results, the cause of the acute affections of the metal miners seem to be injurious gases produced by blasting; but the far greater amount of lung disease probably proceeds from the inhalation of solid particles. The atmosphere being impure from organic matter and carbonic acid, from respiration and lights, may itself aid the action on the lungs by lowering generally the health, especially by lessening the force of the heart, interfering with aeration of the blood, and by introducing into the body putrescent animal substances.

These results require not only more perfect ventilation in mines, but a different system of blasting, boring, and lighting. It is possible that gun-cotton, which, in proportion to the work done, gives out much less amount of gases, may eventually supersede gunpowder.

Poisoning by Carbonic Oxide.—An essay by Pokrowsky,† is chiefly important, first, as confirming the results obtained by Bernard, Hoppe, and Meyer; and, secondly, of showing the process of recovery. He confirms the statement that the hematoglobulin, or, as it is now called by Professor Stokes, of Cambridge, the Cruorine, is rendered incapable of undergoing its normal aeration and of passing from the purple to the scarlet variety, when from ½ to 1 per cent. of carbonic oxide are inhaled. This is the most essential part of the poisoning; as consequences of this, the temperature of the blood falls, the nervous centres of the spinal chord are paralysed, as shewn by paralysis of reflex action, though the conducting power is unchanged, sensation is not altered, and the muscles retain their irritability. At length complete paralysis comes on.

Recovery is possible if the amount of CO is not too great, and the process appears to be by the gradual conversion of CO into CO^2, and the elimination of this latter gas.

Poisoning by Sulphuretted Hydrogen.—Much doubt still exists as to the exact effect of sulphuretted hydrogen inhaled into the lungs, or taken in the drinking water, and, therefore, the experiments of Professor O. Weber‡ on the injection of sulphuretted hydrogen and sulphide of ammonium directly into the blood are of great interest. If the same effects are not produced by inhalation or by drinking, it can only be because the amount in the air or water is small, or is very slowly introduced, or is neutralized in some way before it has circulated far in the blood. Weber had already shown that the phenomena of Septicœmia (without metastatic abscess) are produced when filtered and non-corpuscular putrid fluids are injected into the blood, but in this last essay he has investigated the effects of the injection of the products of the decomposition of such fluids, viz., of sulphuretted hydrogen, sulphide of ammonium, and butyric acid.

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* Report on Mines. Appendix B, p. 236.

† Virchow's Archiv, 1864; Band 30, p. 525.

‡ Abstracted in Sydenham Society's Year Book for 1864, p. 227.

The effect of injected solution of sulphuretted hydrogen was quite the same as that of the putrid fluids themselves, viz., profuse diarrhœal evacuations, croupy inflammations of the bowels, congestions of the lungs, liver, spleen, and kidney, fever, irritation of the spine and opisthotonos. In some cases the symptoms were quite choleraic, with decided lowering of the temperature of the body. The blood corpuscles were much contracted and wrinkled; the blood becomes dark, and coagulates slowly.

Sulphide of ammonium acted in the same way, but less powerfully. Butyric acid produced somnolence, like urœmia, great apathy, and sometimes, though not constantly, slowness of the respirations.

Rabbits died immediately after the injection of a drachm of water saturated with SH, and even two drops of a saturated solution in a drachm of water was sometimes sufficient to kill a rabbit.

In reading these experiments, and in seeing how small an amount of sulphuretted hydrogen can, if it fairly enter the blood, produce poisonous symptoms, the thought suggests itself whether the effect of poisonous animal substances in drinking water may not sometimes arise in this way. The decomposition might go on in the blood after absorption, and enough SH be thus produced to cause the symptoms of septicœmia. It is impossible to conceive, however, that any process like this could go on in the lungs, as the quantity of organic matter which could be absorbed from the air must be extremely small. SH is eliminated very rapidly from the mucous membrane of the lungs, when injected into the blood.

Infusoria in the Atmosphere.—By condensing the water of the atmosphere, Lemaire* has endeavoured to determine the amount of vitrios, bacteria, monads, &c., in the air. Like others, he found them to be decidedly more numerous when the air was contaminated with products thrown off from putrifying animal or vegetable substances.

During the last year nothing more has been made out of the effect of these germs in the air on health. The statement of Davaine that the splenic apoplexy of the sheep is produced by bacteria, has not been confirmed, and in one case the blood was examined unsuccessfully for bacteria.

MM. Leplet and Taillard have injected bacteria (produced in vegetable and animal infusions), into the blood without any bad effects, except in one case, when decomposing serum of blood caused dysenteric and convulsive symptoms in a dog.

The controversy between Pasteur and his opponents as to the spontaneous generation of infusoria is not yet ended, but is apparently about to be decided in his favour. Dr. Child† believes that by the employment of very high power ($\frac{1}{50}$th) he has founded organisms which could never be detected by the lower power used by Pasteur.

VENTILATION.

A modification in Dr. Arnott's chimney-valve has been proposed by Mr. Boyle, an engineer. The objection to Arnott's valve is the possibility of the reflux of smoke. Mr. Boyle uses small plates of talc inclined at such an angle as to close an opening by their own weight, and yet light enough to be lifted by an extremely feeble current. The apparatus is fixed in the chimney, the draught in which is sufficient to keep the valves open, and yet the least down draught closes them. The effective open area is said to be about nine square inches.

* Compt. Rendus, 1864, vol. 59, p. 317.

† Proceedings of the Royal Society, 1865. No. 74.

The same engineer has also proposed an improved inlet; a round plate working on a screw can be brought nearer or farther from a corresponding opening in the wall; the air entering from outside strikes against the plate, and then passes between it and the wall, spreading out in a circular form; its impetus being checked, and being thus spread out on the wall, no draught is felt; the size of the opening can be altered or the opening can be closed by a few turns on the screw. In some cases, as when air is admitted near the bottom of a room, this may be better than the Sheringham valve.

*Ventilation by Hot-air Chambered Stoves.**—Dr. Braun gives a description of Boehms's method of ventilation, which is by admitting the fresh air from outside round a well-contrived stove (Mantelofen—Calorifère) and allowing it to blow into the ward. Shafts are constructed for the discharge of the foul air; each shaft has two openings, one close to the floor, one at the ceiling, and one or other of these can be closed. An ingenious anemometer has been contrived which not only measures but regulates the passage of air.

The largest stove is 5½ feet long and 3 broad. The dimensions of the canal leading to it are not given, but are said to vary with the size of the ward. The hot-air chamber is constructed round the stove.

A valve is so arranged as to let the fresh air pass through the space round the stove, or to pass the ward air through this.

If the difference of temperature be slight, and the air be still, gas can be burnt in the outlet tubes, but this has never yet been done.

The anemometer which was constructed shows one foot per second. It is placed in every discharge tube.

By this means not only 60—80 cubic metres (80 = 2,480 cub. feet), but even 150 cubic metres (4,650 cub. feet), were given per head per hour.

Braun states that when by the old system (Meissners Mantelofen) 10 cubic metres per head per hour were given, the mortality was 30 per 1,000; when 60 cubic metres were given, it sank to 5 per 1,000 (p. 182).

Purification of Air.—Bromine has been lately very much used† in the Federal military hospitals, both as an arrester of gangrene and as a disinfectant. For the latter purpose a solution of bromine in bromide of potassium is placed in saucers and exposed to the air, so that there shall be a constant smell of bromine; the vapour is, however, very irritating, and must not be disengaged in too large an amount.

There is no evidence as to the relative value of bromine and chlorine.

The application of heat in the form of boiling water, and especially of dry heat, has been lately again strongly recommended by Dr. Shann,‡ who has brought together the little that is known of the power of this agency. It has also been largely employed in America.§ It is probable that a heat of at least 250° Fah. is expedient to completely disinfect clothing.

WATER.

Production of Diarrhœa from Sedimentous Water.—The following instance of the effect of an impure water, and of the means taken to remedy the evil, has been communicated to the writer by Dr. Albert A. Gore (Staff Assist.-Surg.)

At Bulama, on the West Coast of Africa, in August, 1864, the water of a well produced violent diarrhœa in the persons who drank it. It was found to be full of floating impurities: to be of a milky colour, and with a faint acid reaction. On standing for 24 hours a thin lightish-brown sediment fell. That the suspended matters were the cause of the diarrhœa was proved both by finding that no dissolved salts existed to which the diarrhœa could be attributed (for the hardness was only equal to 1·23 grains of carbonate of lime per gallon, and although chlorides were present in some amount, subsequent experience showed that the diarrhœa was not caused by them) and by the results of filtration.

Under the microscope the suspended matters were found to consist of a large amount of organic matter, debris of plants, chlorophyll, minute cellular and branched algæ, monads, polygastrica, ciliated ova, and minute particles of sand and alumina. All those were caused by surface-water washing impurities into the well, which was merely a shallow hole dug on the site of a spring. When the water was passed through dripstone it still remained milky, and gained a little in hardness, though subsequent passage through a filter made it quite limpid ; it then became quite harmless.

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* Ueber Luftwechsel des neuen Ventilations-Bau mit Benützung der natürlichen Temperatur-Differenzen und Luftströmung. (Vorgetragen in der K. K. Gesellschaft der Aertzte, 15 April, 1864.) Von Prof. D. Carl Braun.

† Military Medical and Surgical Essays, p. 85.

‡ Transactions of the Social Science Association for 1864, p. 558.

§ Mil. Med. and Surg. Essays, p. 89.

As soon as this was ascertained a good trench was dug round the well to arrest the surface-water, and an outlet trench to carry off this water was also provided ; the edges of the well were raised so that no surface impurity could get in ; the well was cleaned out and covered with a thatched roof. Next day the water was quite clean and without a particle of impurity, and the diarrhœa ceased.

Dr. Gore mentions that in the recent epidemic of diarrhœa on the Gold Coast, the well water was said to have this milky appearance. He also says that in Bulama there is a tradition that the great mortality in Captain Reeves' Settlement in 1792 (when 78 died out of 84 persons) was due to the drinking of water rendered milky by the poisonous white juices of the many plants which are present there. Dr. Gore, however, thinks that fevers also must have prevailed.

FOOD.

Amount and Kind of Food.—Dr. Lyon Playfair has published an interesting pamphlet on the amount of food and its relation to mechanical force.* He divides the work performed in the body into five kinds—

1. Mental work.
2. Calorific work.
3. Internal dynamical work.
4. External dynamical work.
5. Digestive and assimilative work.

The pamphlet is chiefly occupied with the three last kinds of work.

Dr. Playfair, first, endeavours to fix precisely the amount of food required by an average man under the following conditions :—

1. For mere subsistence, *i.e.*, without exertion of external mechanical force.
2. For complete health, with exercise of from five to seven miles daily.
3. For active work (20 miles walking daily).
4. For extremely hard work, as that of navvies engaged on railways.

He gives tables to illustrate this, of which the following gives the mean results :—

MEAN Amounts in Ounces Avoirdupois, of the Classes of Food under different Conditions for Male Adults.

	Bare subsistence Diet.	Diet in quietude.	Adult in full health (mean of Soldier's Diet in Peace.)	Adult in active work (mean of Soldier's Diet in War.)	Adult in laborious work (hard-worked Labourers.)
Flesh formers (nitrogenous substances)	2·	2·5	4·2	5·5	6·5
Fat	0·5	1·	1·4	2·5	2·5
Starch	12·	12·	18·7	20·	20·
Starch equivalent (*i.e.*, starch and fat reckoned as starch)	13·2	14·4	22·	26·	26·
Total carbon in nitrogenous substances, fat and starch	6·7	7·4	11·6	13·7	14·3
Mineral matters	..	..	·71	·9	

Having fixed these amounts, Dr. Playfair then proceeds to calculate the amount of mechanical force obtainable. His great object is to show that the metamorphoses of the "flesh-formers" (nitrogenous substances) are sufficient to account for all the mechanical force.

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* On the Food of Man, in relation to his Useful Work. By Lyon Playfair, C.B., LL.D., F.R.S., &c. Edin., 1865.

Subtracting from the amount of the nitrogenous substances (5·5 ounces) of the labourer in active work, 2 ounces taken for mere subsistence, it is concluded that 3·5 ounces represent the nitrogenous material used in the production of outward mechanical force.

Taking the composition of albumen as

Carbon	53·8
Hydrogen	7·0
Nitrogen	15·7
Oxygen	22·3
Sulphur	1·2

and omitting the sulphur, the 1 atom of albumen with 100 of oxygen forms 3 equivalents of urea [$3(CO^2(NH^2)^2)$] ; 21 equiv. of carbonic acid [CO^4] ; and 13 of water (H^2O). Seven times as much carbon derived from the transformation of nitrogenous substances passes off by the lungs as by the skin ; the carbon passing off by the kidneys is estimated as carbonic oxide ; that by the lungs as carbonic acid.

The mechanical force obtainable from the transformation of albumen is then obtained by calculating the calorific value, and then converting this into mechanical force. Dr. Playfair adopts the calorific units proposed by Dr. Andrews, viz., 7,900 for carbon, 33,808 for hydrogen, 2,307 for sulphur, and he calculates that 2227·7 will be the amount for carbonic oxide.

The calculation how much calorific power is contained in 1 ounce or 437·5 grains of dry albumen is thus done.

There are in an ounce of albumen

C	235·37	grains
H	30·62	„
N	68·68	„
S	5·25	„
O	97·56	„
	437·48	

Some of the carbon ($\frac{1}{7}$) is converted into carbonic oxide, some into carbonic acid ; some of the hydrogen combines at once with the oxygen to form water, the surplus takes oxygen from the air ; the sulphur takes oxygen and becomes sulphuric acid. Multiplying then those numbers by the calorific units given above, we have—

C ($\frac{6}{7}$th)	=	201·75	×	7900·	=	1593825 heat units
C ($\frac{1}{7}$th)	=	33·62	×	2227·7	=	74895 „
H	=	8·05	×	3380·8	=	272154 „
S	=	5·25	×	230·7	=	12111 „
						1952985 „

This number being brought into kilogrammes by dividing by the number of grains in a kilogramme (15,432), the result is that the trauformation of one ounce of albumen would develop heat enough to raise 126·5 kilogrammes of water 1° cent. If this be multiplied by 425, it gives us the amount of corresponding mechanical force, which is in this case (126·5 × 425) 53,762 kilogramme-metres (*i.e*, 53,762 kilogrammes raised 1 metre high), or in English measures, 38,7946 foot-pounds, or in other words, 173 tons lifted one foot.

If we suppose 5·5 ounces of albuminates to be taken daily, the total mechanical force obtainable would be (173 × 5·5) 951·5 tons lifted a foot.

Now is this force sufficient for the work of the body? Dr. Playfair answers this by enquiring what is the lowest amount of albuminates necessary to support life, and from a consideration of different diets he fixes this at 2 ounces of albuminates, which would develop mechanical force equal to (173 × 2) 346 tons lifted a foot. The work of the heart is taken by Haughton at 122 tons lifted a foot, which would leave mechanical force equal to 124 tons lifted a foot for all the remaining internal work of the body, viz., the movements of respiration, digestion, the nervous and mental actions, &c. Whether this calculation is near the truth cannot be decided at present.

Admitting, however, that mechanical force developed by 2 ounces of albuminates, and equal to 346 tons lifted a foot, is concerned in the internal work of the body, there will remain the mechanical work developed by the remaining 3·5 ounces of albuminates, which is equal to (173· × 3·5) 605·5 tons lifted a foot, for the external work or labour of the body. But as Dr. Playfair calculates that 1-12th of the 3·5 ounces of albuminates passes off in the fæces without being made into tissue, he deducts 1-12th from this amount, and considers that the 3·5 ounces would actually give rise to a force equal to 555 tons (nearly) lifted a foot. This is in fact not very far from the amount of work which may be got out of a well-fed athletic labourer, but is more than could be got out of most men.

Dr. Playfair, therefore considers that the transformation of the nitrogenous food is sufficient to account for all the mechanical force of the body without supposing that the fats and starches have any share in this.

He then proceeds to adduce arguments that the dynamical action of the body depends wholly on the transformation of the tissues, and concludes that the origin of energy in the muscle must be sought for in the blood, or in the transformation of the fat in the muscle, or in the transformation of the substance of the muscle. Dismissing at once the first point as inconsistent with the retention of irritability of muscles, from which the supply of blood is cut off, he proceeds to the second possibility, viz., the development of force from combustion of fat in the muscle. This leads him to the question whether mechanical force is generated by fat or starch, and he decides that it is not, partly because "we require the combustion of all the non-nitrogenous constituents of food to enable us to account for animal heat," and partly from a consideration of the inanition experiments of Bidder and Schmidt and Bischoff and Voit.

Concluding that the fat of the muscle is not then concerned in the production of force, he believes that "Liebig is amply justified in viewing the non-nitrogenous portions of food as mere heat-givers. They never can act vicariously for albuminous bodies as tissue-formers, although tissues may and do evolve heat by transformation when required to do so. That heat-givers do operate indirectly on the waste of tissues cannot be questioned." (p. 73.)

At the same time Dr. Playfair points out that the heat developed in muscles, when not due to the combustion of fat, is probably due to "lost work" —*i.e.*, if the muscle does not act, but yet is transformed, heat or electric force is produced instead of motion. In coming to this conclusion he has approached, without knowing it apparently, a question lately raised by Mayer, who attributes the heat of fever to the transformation of mechanical force, or, in other words, to muscular transformation ending in heat instead of motion.

In the latter part of his lecture, Dr. Playfair enters on the question how far the secretions of the body are measures of work

One grain of urea is derived from 3·01 grains (say 3) of dry albuminate; a man, therefore, taking 4 oz. or 1,750 grains of albuminates, should pass $\frac{1750}{3}$ = 583 grains of urea, in which also the uric acid is included. This is tolerably near the truth, though a little higher.

As an instance of hard-worked men, he takes two weavers, whose food and excretions were examined by Dr. E. Smith; they received (average of 26 days) 2,333 grains of dry albuminate, containing 366 grains of nitrogen, they passed 328 grains of nitrogen in the urea and 40·93 grains in the fæces, giving a total of 368·93 grains. From investigations of his own he finds that the following amount of urea was passed (average of two days) by labourers:—

Hammermen	530 grains of urea.
Quarrymen	550 ,,
Tailors	608 ,,
Weavers	703 ,,
Blacksmiths..	695 ,,
Forgemen	740 ,,
Hardworking pedestrians	800 ,,

Now the 5·5 ounces of albuminates, less $\frac{1}{12}$th, would give 2,201 of dry albuminates, and this would give 733·8 grains of urea (including uric acid).

The carbonic acid of the lungs is a complex measure of work, as it represents both dynamical and respiratory action.

The nitrogen in the fæces (average 1·7 per cent. in fresh excrement) he looks upon as derived from the albuminous ferments (pepsin, ptyalin, pancreatine, and intestinal ferment) which, as Marcet has argued, have become degraded and effete during their working on the food, and are not fit to return to the blood. The proper amount of nitrogen derived from these sources in the fæces he considers to be $\frac{1}{8}$th of that in the urine. When it is larger than this, he believes that the nitrogen of the fæces is then derived, either from an excess of degraded ferments or from excess of undigested food.

Such then is a brief abstract of this important lecture, in which the dietetic value of food is discussed with great acumen and clearness. It is of importance to obtain more complete evidence of the amount of albuminates necessary for the internal work of the body. But it can hardly be doubted that Dr. Playfair has shown that the albuminous tissues can really produce all the mechanical force required. Considering, however, the way in which fat enters into the composition of nervous and muscular tissues, it still remains not quite decided that it may not be concerned in some degree in the production of mechanical force, though Dr. Playfair's general scope of argument and evidence does certainly seem opposed to such a view. It is not, perhaps, capable of immediate decision at the present moment.

There is one table in Dr. Playfair's lecture, which we extract. Through the kindness of Colonel Harness, R.E., and Lieut.-Colonel Collinson, R.E., he obtained accurate accounts of the exact amount of food consumed by 495 men of the Royal Engineers. The observations were carried on for twelve days.

Dietaries of the Royal Engineers from the 1st to 12th January, 1865.

Names of Companies.	No. of Men giving Returns.	Weight of solid Food.	Flesh-formers (nitrogenous Substances)	Fat.	Starch, Sugar, &c.	Starch equivalent (heat-givers).	Mineral Matter.	C Carbon in Flesh-formers.	C′ Carbon in Heat-givers.	Total Carbon C + C′.	Ratio C : C′ : : 1 *x*.	Ratio of Flesh-formers to Starch equivalent.
		oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
8th Company ……	30	68·6	5·37	2·68	22·96	29·37	0·90	2·889	12·257	15·146	4·24	5·47
23rd ”	56	73·75	5·65	2·65	23·63	29·62	0·98	3·039	12·531	15·570	4·12	5·24
35th ”	90	64·22	4·84	2·94	20·24	29·24	0·83	2·603	11·250	13·853	4·33	6·04
36th ”	80	63·16	4·83	3·66	20·83	29·80	0·87	2·598	12·066	14·664	4·64	6·17
37th ”	67	68·2	5·39	2·64	22·70	29·31	0·87	2·899	12·111	15·010	4·17	5·43
38th ” (Chatham)	20	68·4	4·84	3·45	22·92	30·74	0·87	2·603	12·832	15·435	4·92	6·35
38th ” (Kensington)	9	63·0	4·16	2·72	20·99	27·46	1·25	2·238	11·413	13·651	5·09	6·60
39th ”	68	71·2	5·27	2·63	23·19	29·35	0·96	2·835	12·321	15·156	4·34	5·57
40th ”	75	62·2	5·34	2·89	22·56	29·58	0·84	2·872	12·241	15·113	4·26	5·54
Mean of all returns..	495	66·97	5·08	2·91	22·22	29·38	0·93	2·730	12·113	14·844	4·45	5·82

"The working soldier finds it necessary to take about 5 oz. of flesh-formers (nitrogenous substances) daily. The only notable exception is in the case of a detachment of the 38th Company, stationed at the South Kensington Museum. This exception furnishes a ready explanation, for although these soldiers are even better paid than those at Chatham, their work is of a less laborious character, being chiefly that of draughtsmen, photographers, &c.; with this work they do not require a larger quantity of flesh-formers than is consumed by soldiers of the line, and, accordingly, we find that their diet sinks to this level. Omitting this exceptional case, we find a singular uniformity in the starch equivalent of heat-givers." (p. 17.)

Albuminoid Substance in Milk.—M.M. Millon and Commaille* have described an albuminoid substance in milk different from casein and albumen. When these two substances have been thrown down, a substance remains in solution, and is precipitable by nitrate of mercury. They call it lacto proteine and give as its composition $C_{36}H_{31}N_5O_{18}$; Cows' milk contains about 20 grains per pint.

Dried South American Beef.—As a good deal of attention has been lately given to the use of the dried American beef, a few words on its nature and composition may be useful.

Under the terms Tasajos and Charqui, two kinds of meat are prepared in South America, but it is probable these words have not always been used in the same sense.

According to Mr. Bridges Adams,† the Tasajos is meat cut in thin strips, dipped in brine, and then partially dried. Charqui is thin strips of muscular fibre from which the fat is removed, dried rapidly by sun-heat, and sprinkled with maize.

Some analyses of the salted meat have been made by Hassall.

ANALYSIS of Charqui (Tasajos?), by HASSALL.

	In 100 Parts.				
	Water.	Nitrog. sub.	Fat.	Ash.	Undetermined.
Lean English fresh beef..	73·33	20·76	4·08	1·2	·68
„ „ salt „	70·488	18·170	4·374	6·165	·803
Dried charqui	33·820	40·954	2·958	20·456	1·812
„ „	29·70	39·690	10·41	18·55	1·65
Rolled charqui..........	46·690	27·500	7·995	16·860	·955
Pickled charqui	59·00	15·40	12·17	11·37	2·06

Liebig's "Extractum Carnis."—The "essence or juice of meat" has been recommended by Liebig for many years, but it has only lately been produced at a low enough price to be introduced with effect into the market. At present it is being made in South America and sent over to Europe. The meat is scraped clean off the bone, put into clean vessels, and subjected to a gentle heat; by degrees a dark viscous fluid collects, which contains the salts, creatin, and other nitrogenous principles, and is said to be highly nutritious. It keeps for years, and when used, a small quantity is simply mixed with hot water, and a little salt and seasoning are added.

It is likely to be largely used in hospitals, and especially for soldiers in time of war. (See Special Report.)

DISEASES CAUSED BY FOOD.

Trichinosis.—A great number of papers have been published on the trichina disease during the year, the most important of which are elaborate treatises of Professor J. Vogel,‡ Leuckart,§ Fiedler,|| Thudichum,¶ Groth,** Althaus,†† Meisner,‡‡ and others.

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* Compt. Rend. 1864. Vol. 59, p. 303.

† Journal of the Soc. of Arts, March, 1865.

‡ Archiv für wissenschaftliche Heilkunde, 1864, No. 1, p. 12.

§ *Ibid*, p. 56.

|| Archiv der Heilkunde, 1864, p. 466.

¶ Seventh Report of the Medical Officer to the Privy Council, p. 302. This elaborate paper contains also a full account of the cysticerci and other parasites of the pig, and other animals, and the production of tænia.

** Virchow's Archiv, 1864, Band 29, p. 602.

†† Trichinosis, London, 1864.

‡‡ Schmidt's Jahrbuch, 1864, p. 318.

It is now known that the trichina may attack the sheep and the dog, so that the importance of this question is extending. Various outbreaks have occurred, most in Germany, but cases have now been seen in America, France, and Italy.

As to the number of young trichinæ which can be produced by one animal, it is now known to be much greater than was at first supposed. Both Leuckhart and Vogel say that a female will produce from 250 to 500 young, or even more, on an average 300. Now, a piece of flesh thickly strewn with trichinæ has been known to contain 100 trichinæ in one grain of weight. Supposing one ounce of such meat only was taken, and that only half the trichinæ were fertile, the possible number of young trichinæ produced in from six to fourteen days would be (50 × 437·5 × 300) 6,562,500. Thudichum has calculated that if the trichinæ were in these numbers (100 in every grain of muscle) there would be 28 millions in the body of a man.

Leuckhart fixed about the sixth day for their wanderings, but Fiedler believes no day can be precisely named. Much depends on the age and condition of the trichinæ. Fiedler believes that the trichinæ enter chiefly in the lymph and blood streams, and only in a few cases by directly piercing the muscles.

With respect to the detection of trichinæ when encapsuled and calcified, they are sometimes clearly visible to the naked eye; but mere ocular inspection can seldom be alone relied on. To see them a piece of flesh (taken from the pectoral, if possible, or from the masseters) should be put in a watch-glass, and strong liquor potassæ (one drachm caustic potash to one ounce water)* poured over it. In a few moments the fibre begins to get clear, and the before invisible trichinæ can be seen as white specks, especially if the watch-glass be placed on a black table, and the rays of the sun are allowed to fall on it. In a few minutes the trichinæ began to get paler and indistinct. Or a small piece of flesh being torn gently with two needles, is placed on a slide, moistened with liquor potassæ, covered gently with a thin glass, and looked at by transmitted light. A five or six diameter lens will then detect them. Vogel recommends acetic acid instead of potash, but I believe dilute hydrochloric acid is better.

The microscopic examination is the best, and really the only proper plan. One hundred diameters is sufficient. The fibres of the meat are torn gently asunder; liquor potassæ or dilute hydrochloric acid are used if nothing can be seen. Several samples should be taken, and especially from near tendons.

Occasionally an uneducated eye might mistake fat-cells for trichinæ, but with a little care this mistake could not occur. A more likely mistake would be to take the so-called Rainey's corpuscles, sometimes found in the muscles of the pig for trichinæ. These bodies are dark, granular masses, of an oval figure, and with a transparent capsule, which, when ruptured, discharges oval bodies; sometimes the capsules are very long, and even star-shaped. Their true nature and origin is not yet known. They do not irritate the muscular fibre, and are probably unconnected with either cysticerci or trichinæ.

With regard to prophylaxis, or destruction of the trichinæ by cooking or preparation, the experiments of Fiedler† are the best hitherto made.

A temperature of – 2°R (= 27·5 Fah.) does not affect them, but – 11°R (= 7·25 Fah.) kills them.

With regard to heat, Fiedler has repeated the experiments previously published, and finds that the trichinæ bear a temperature of 42°R (= 126°·5 Fah.), but die at a temperature of 50°—55°R. (144·5 to 155°75 Fah.). The meat was, however, decomposed, and he thinks also that the encapsuled trichinæ may demand a higher temperature, but he has made no experiments.

Now, the temperature of cooking will generally be above 155° Fah., so that well cooked meat will generally be safe even if trichinæ are present. Küchenmeister has made many experiments on the temperature of meat during different kinds of cooking, which show that the temperature generally is above the coagulating point of albumen; and Thudichum* states that cooked pork had a temperature of 94° cent. to 100°·5 cent. As a practical rule, it may be considered that if the interior of a piece of boiled or roasted meat retains the appearance of the original blood colour, the temperature has hardly been over 131° Fah. On the other hand, a temperature of 77°–80°R (207°·75 to 212° Fah.) is only reached in the interior after three hours and three-quarters' boiling. In the Posen epidemic the meat had been boiled for one hour and a half, and yet spread the disease.

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* Leuckart. Op. cit., p. 64.

† Archiv der Heilkunde, 1864, p. 466.

The duration of the smoking which is necessary to kill the trichinæ has not yet been perfectly determined. It is very different, according to the size and character of the piece of meat. Sometimes the outer part is thoroughly smoked, and is not dangerous, while the inner part, and especially the neighbourhood of the bones and tendons contain living trichinæ.

Küchenmeister, Haubner, and Leisering, and Hüch state that there are three kinds of smoking in Germany—"the warm, the cold, and the quick smoking." In the first case, which takes about 14 days, and is conducted in a smoking chamber, the heat does not exceed 30 R. (= 99½° Fah.). The cold smoking is conducted in a chamber connected with the chimney, and in which the heat is moderate, changeable, and even in its greatest degree hardly reaches 99½° Fah. The "quick smoking" is merely treatment with pyroligneous acid.

Probably, as a rule, the smoking does not kill the trichinæ.

With respect to the duration of life of the trichinæ when encapsuled in the muscles, a very important addition to the history of trichinosis has been made by Dr. Groth.†

A woman of Altona, aged 52, had, in 1861, a small, cancerous tumour extirpated from the breast. On section, encapsuled trichinæ were found in this tumour. On inquiry it was found that she had been in America, and while there in 1856 she had an attack of a disease termed rheumatism, but which exactly corresponded to the now well-known symptoms of trichinosis. This was evidently produced by eating pork, which (either salted or smoked) formed a great part of her food. She recovered very slowly, and returned to Germany. After the first operation in 1861 she had returns of the tumour and was again operated on. She died in February, 1864.

On section very numerous encapsuled trichinæ were found in many muscles, and very frequently two spiral-formed rolled-up trichinæ were lying in one sac.

It being quite certain that these trichinæ must have been introduced in the attack of 1856 it became very important to learn if they were still living. A portion of the trichiniferous pectoralis major muscle, which had been lying in the dead-house, and was decomposing, was given to a healthy cat, who very soon became ill, had diarrhœa, passed small trichinæ, and then died with marked symptoms of trichinosis. On section innumerable trichinæ were found, both in the alimentary canal and the muscles.

It is, therefore, clear that trichinæ, after being in the muscles seven years, are yet living, and will breed rapidly when they pass into the stomach.

It is presumed that the trichinæ found in the carcinoma must have been derived from fibres of the pectoral muscle.

With regard to treatment, nothing certain has been made out. The picrate of potash seems useless, and no other parisiticide has yet been proved to act with certainty. Benzin has been used by Mosler, but such large doses are necessary as to make it doubtful whether it would be safe to give it to men. Fiedler,‡ in fact, doubts its use *in toto*, though Mosler, from some late experiments,§ repeats his opinion of its efficacy.

Alcohol, when taken with trichiniferous meat, has appeared to prevent the development, and yet out of the body, weak alcohol, such as could only be present in the stomach, does not touch them. Garlic and areca nut have been lately tried by Thudichum without apparent benefit.

Sausage Disease.—It is possible that some of the cases of poisoning by sausages may have been owing to trichinæ, but this is certainly not the case always. Dr. Husemann[*] has investigated a number of recorded cases, and finds that the symptoms are so peculiar that they cannot be confounded with trichinosis.

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* Op. cit., p. 410.

† Virchow's Archi., 1864, Band 29, p. 602.

‡ Archiv der Heilkunde, 1864, p. 344.

§ Schmidt's Jahrbuch, 1864, No. 11, p. 192.

Disease from Fermenting Beer.[†]—After a feast of country people Dr. Strauss was called to more than 70 persons, all affected in the same way—strong fever, great diarrhœa, continued vomiting, and great sweating, great prostration, and a comatose condition. All the symptoms had gone off by the second day.

It was traced to some beer, which, however, contained no adulteration; but the brewer, not having enough fermented beer, prepared an entirely fresh brew the day before the feast, and added to it a great quantity of yeast. The fermentation had gone on in the stomach and bowels, producing the above symptoms, which Strauss seems inclined to attribute to carbonic acid.

SOILS.

Water Retained in Soils.—In some lectures before the Society of Arts on Water Supply, Professor Ansted[‡] gives a statement of the amount of water ordinarily contained in soils of different permeability.

	Water in each cubic foot in gallons.
Loose sea sand	2·
Ordinary sandstones	1·
Best „	·625
Limestones (densest)	·5
Bath Stone	1·
Magnesian limestone	1·5
Soft chalk	2·

Clays, he says, often contain as much as 10 per cent. of water by weight.

When wells are sunk the soils which yield most are chalk and soft sandstone; but from neither can more than one million gallons per diem be expected from a single well, and to yield this amount the wells must be a mile asunder.

Marshes in Mexico.—M. Jourdanet§ remarks that some of the marshes in Mexico are innocuous, on account of the great cooling of the earth, which occurs at night. A thermometer laid horizontally on the ground fell to 39° Fah., even to 32°, while 5 metres (16 feet) above the same ground a thermometer marked 50° Fah. Also, the direct rays of the sun appeared to hinder the development of the miasma; for in the worst marshes of Central America, as of Italy, travelling is safe in the hot parts of the day, though very dangerous at night, and especially in the evening, after a burning midday heat. At this time iron rusts rapidly, and fermentation processes go on very fast.

So also in moist, foggy, cloudy days the malaria is worse; and another example of this is found in the unsunned air of the jungle in the tropics.

In some parts of Yucatan the hot sun and dry air prevents malaria, and the white race is strong and powerful.

Hill Stations in the French West Indian Islands.—Dutroulau states that the French in Guadaloupe have had for some time a station 550 metres high (Camp Jacob). This has done great service.

In Martinique a "Camp de Preservation" was some time since founded, and now a large establishment will be put there, and probably all the French troops will be located on the hills.

REMOVAL OF EXCRETA.

The position of this question remains virtually the same as last year. The Commission appointed by the Lords of the Treasury to inquire into the application of water-sewage to land have made a third Report. The following are the conclusions of their Report addressed to the Treasury; the opinions have, however, been generally anticipated.

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[*] Quoted by Thudichum. Op. cit., p. 391.

[†] Strauss in Virchow's Archiv, 1864, Band 30, p. 601.

[‡] Journal of the Society of Arts, February, 1865.

§ L'Union Méd., 1862, November, No. 129, and Schmidt, 1864, No. 5, p. 239.

"As the results of our labours, extending over eight years, we have confidence in submitting to your Lordships the following conclusions:—

"1. The right way to dispose of town sewage is to apply it continuously to land, and it is only by such application that the pollution of rivers can be avoided.

"2. The financial results of a continuous application of sewage to land differ under different local circumstances; first, because in some places irrigation can be effected by gravity, while in other places more or less pumping must be employed; secondly, because heavy soils (which in given localities may alone be available for the purpose) are less fit than light soils for continuous irrigation by sewage.

"3. Where local circumstances are favourable, and undue expenditure is avoided, towns may derive profit, more or less considerable, from applying their sewage in agriculture. Under opposite circumstances, there may not be a balance of profit; but even in such cases a rate in aid, required to cover any loss, need not be of large amount.

"Finally, on the basis of the above conclusions, we further beg leave to express to your Lordships that, in our judgment, the following two principles are established for legislative application:—First, that wherever rivers are polluted by a discharge of town sewage into them, the towns may reasonably be required to desist from causing that public nuisance. Second, that where town populations are injured or endangered in health by a retention of cesspool matter among them, the towns may reasonably be required to provide a system of sewers for its removal.

"And should the law as it stands be found insufficient to enable towns to take land for sewage application, it would, in our opinion, be expedient that the Legislature should give them powers for that purpose.

"ESSEX, "J. B. LAWES,
"ROBERT RAWLINSON, "JOHN SIMON.
"J. THOMAS WAY,

"8, *Richmond Terrace, Whitehall, March*, 1865."

The "dry system" continues to make way in cases in which either water cannot be procured, or where its removal is difficult. The opinion is gaining ground that it is necessary to separate the solid fæces from the urine, in order to prevent early decomposition.

EXERCISE.

In his Report on the Air of Mines,* Dr. Angus Smith gives an account of the amount of labour performed by some bricklayer's labourers, for the purpose of comparing this with the work done by the miner in ascending.

A bricklayer's labourer ascended a ladder 30 feet high 126 times daily; 84 of these times he carried up 84 lbs. of bricks in a hod weighing 10 lbs., and 42 times he carried up 68 lbs. of mortar in the hod of 10 lbs. He carried the bricks and mortar to the ladder over a flat surface of 120 feet 126 times.

In addition, the man carried the empty hod (10 lbs.) down 30 feet for 126 times, and then 120 feet on level ground. He also filled his hod (height 3 feet) by lifting the bricks and mortar into it from the ground. Taking his own weight at 150 lbs., and considering the descent as equal to walking on level ground, the work is equal to 569·6 tons lifted one foot.

This work is said to be so hard that Englishmen will not face it; if they do, they break down in a few months. The hod labourers are thin, muscular, and hard.

"They live roughly, and die roughly, and in general very suddenly, from some great exposure to wet, without any succeeding care."

It is said the men do not suffer from lung diseases; but possibly the sudden deaths, if correct, may be owing to some heart disease.

Professor Forbes has stated that when the ascent is vertical, 1,100 feet per hour may be assumed as the probable ascent per hour. Taking the working day at 8 hours, and the man's weight at 150 lbs., such an ascent would be equal to 589 tons lifted a foot. When the angle is less than 90°, the height ascended in a hour will, of course, be less.

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* Blue Book, 1865.

Exhaustion of Muscles.—Joh. Ranke* has made some interesting observations on the so-called exhaustion of muscles. Frogs were tetanized with strychnine and thus exhausted.

The experiments showed that during excessive action, destruction products become heaped up in the muscles; and their removal by the normal circulation, or by bleeding, or injections of water restored the contractibility of the muscles. If this be correct, then the injection of flesh fluid into the muscles should produce exhaustion. This was actually found to be the case on experiment. The injection of lactic acid had the same effect; neutralizing the acid with carbonate of soda restored the contractibility.

A tired muscle is therefore not exhausted, *i. e.*, not incontractible. Nutriment is not necessary to restore the contractibility—all that is wanted is time to remove the products of metamorphism.

It is the same with the nerves.

The effect of the muscular juice in suspending power is due to creatin and lactic acid. Hippuric acid has no action on the peripheral muscles, but suspends for a time the action of the heart, having a special action on the cardiac muscular fibre.

Glycocholate of soda and the salts of potash act even more powerfully than creatin and lactic acid; they paralyse rather than fatigue.

Uric acid and grape sugar are the only two substances having no effect.

The excitability of the nervous trunks is increased (as in natural fatigue) by the fatigue-producing substances, viz., lactic acid and creatin.

Urea leaves unaffected the irritability and the power of the muscles, the respiration and heart's action; but annihilates the spontaneous and reflex actions. Its action is exerted on the will, and the centre of control for reflex excitability; on the region situated between the middle of the cerebrum and the middle of the corpora quadrigemina (the controlling organ of reflex action of Setschenow).

Hippuric acid, glycocholate of soda, and the salts of potash suspend the reflex action.

STATISTICAL ENQUIRIES.

Influence of Race on Duration of Life.—Dr. Mayer† has carefully investigated the relative mortality of Christians and Jews in Fürth.

In Fürth the sanitary condition of the inhabitants is bad; 514 out of every 1,000 drawn for the conscription are rejected, whereas in Munich the proportion is 279, and in the entire kingdom 337. Bad food, too early and excessive work, and bad dwellings are the cause.

The mean of 10 years gives as follows in Fürth:—

Life duration of Christians	26
Life duration of Jews	37

The difference begins with the first year of life, and depends on the care which the Jews take of their children.

From 1 to 5 years, died—

Christians	14 per cent.
Jews	10 „

The Jews have the advantage up to 60 years. The expectation of life is at birth.

Christians	30
Jews	50

In Frankfort similar results were brought out.

	Years.		Months.
Mean life duration of whole population =	37	....	7
„ Christians alone =	36	....	11
„ Jews .. .. =	48	....	9

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* Arch. für Anat. and Phys., 1863, p. 322, and 1864; Schmidt's Jahrb., 1864, No. 8, p. 275.

† Deutsche Zeitsch., 60, xxi, Heft 2; Canstatt, 1863, band 7, p. 57.

The half of the children born alive die—

	Years.	Months.
Of Christians	36	6
Of Jews	53	1

Only one quarter of the Christians at Frankfort live beyond 59 years 10 months, while one quarter of the Jews pass 71 years. This is in part owing at Frankfort to the fact that the Jews are in good circumstances, while 1-10th of the Christians are supported by charity.

The Jews chiefly are employed in commerce or are literary; few are labourers.

These are the causes of the increase in population of the Jews; it is not from greater number of children. The above is the cause of the Jewish race more than holding its own among other nations.

Influence of Race on Diseases.—Dr. Glatter[*] has investigated this point in the district of Pesth. Five races inhabit Pesth, viz., Magyars, Germans, Slaves, Servians, and Jews.

1. The Magyars, who live in a marshy country, are little subject to malarious fevers; this immunity allows them to live where other races perish. They make use of an alimentation "grasse et fortement épicée," yet are little subject to gastro-intestinal derangement. Very subject to maladies of cold: rheumatism, dysentery. In 1853 they seemed singularly apt to take cholera.
2. The Germans suffer more from digestive evils. Inhabiting the elevated land on the right bank of the Danube, they are subject to malarious disease in the same proportion as the Magyars. They suffer from typhoid fever, rheumatism, pulmonary tuberculosis; croup in infancy.
3. The Slave, much more subject to malarious fevers than the two former; also to diarrhœa, asthma, but less to pulmonary tuberculosis.

   There seems also antagonism between the intermittent fever and tuberculosis.

   They are less affected by cholera than the Magyars; they are much affected by typhoid.
4. The Servians are much affected by malarious fevers, although they do not generally inhabit marshy regions. The women have a noteable disposition to puerperal fever, hysteria, and uterine cancer.

   They are less subject to typhoid, dysentery, acute rheumatism, asthma, and worms. They are on the contrary much affected by the phlegmasia, and pulmonary tubercles and organic diseases of the heart.
5. The Jews live both in elevated and in low regions; they have a remarkable immunity from the intermittent fevers; convulsions of children, and from the phlegmasia of the respiratory organs. They are on the contrary more affected by itch and other non-febrile skin affections, and by gastro-intestinal catarrhs and hernias.

   Their kind of life, the care they take of their health, and their regular conduct account in part for these results; "it is necessary, nevertheless, to make enter largely into the calculation their special organization."

All statements of this kind on so difficult a subject as the influence of Race must be received with caution.

Vital and Economical Statistics of Hospitals in England and Wales for 1863.—Under this title Dr. Fleetwood Buckle has published a very interesting book, giving a great amount of information on the number of patients, their diseases, mortality, and cost in a great number of hospitals and infirmaries (117) in England and Wales. It is impossible to abstract this work, but it will be found very interesting to all hospital medical officers. Some few points may be extracted. In the various institutions whose numbers could be obtained there were in 1863—

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[*] Casper's Viertel jahrs., 1864, bd. xxv, p. 32-45; analysed in Ann. d'Hygiène, 1865, Jan., p. 224.

11,832 beds
95,661 in-patients.
991,857 out-patients.
7,361 deaths (= 7·607 per cent on the in-patients).

The total cost was £371,933; the average cost per bed £21 11*s.*, or 9·47.

In the metropolis 18 hospitals are calculated, some large hospitals, however, being omitted; the number of beds were 3,738, the in-patients 35,031, and the deaths 2,856, or 9·19 per cent.

The total cost was 143,754*l.*, or 28*l.* per bed.

In the provinces the mortality was 7·672 per cent., and the cost per bed 20*l.* 13s.

The number and results of the operations are very carefully recorded. The total number was 3,340, or, without eye operations, 2,318; the mortality was 209 out of 2,318, or 12·51 per cent. The highest mortality was after ovariotomy (77·27 per cent.), then after paracentesis of the abdomen, thorax, and bladder (31·58), operations which, perhaps, had been better separated; then aneurism and hernia (28·57 and 26·03 per cent.).

The diseases and injuries of 188,630 patients are given, and this is a very valuable table. At the same time, if the in- could be distinguished from the out-patients it would be perhaps better.

The labour which the collection and analysis of these tables must have entailed forbids the hope that this valuable work can be carried on; but few enquiries would do more to advance medicine than statistics of this kind. It is what every hospital ought to do for itself, and the results should be published regularly.

SOLDIERS.

On the Salubrity of Military Hospitals.—M. Legouest, one of the Professors of the Val-de-Grâce, has published a very important paper*, which he wrote in consequence of the discussion at the Academy on the Salubrity of Town and Country Hospitals.

M. Legouest believes that in Military Hospitals, with patients of the same sex, age, profession, &c., the amount of mortality is a perfectly fair test of the healthiness or otherwise of the hospital. He has, therefore, made a comparison between three military hospitals, as affording data for the determination of the question whether hospitals should be urban or suburban. He selects for comparison the Hospitals Val-de-Grâce and Gros-Caillou, situated in Paris, and Vincennes, situated outside Paris. In the two former the period of observation in each is 34 years (1830-1863); in the latter the period of observation is six years (1858-1863).

The total superficies of the ground occupied by the Val-de-Grâce is 90,535 square metres (= 108,279 square yards, = 22·37 acres). The part occupied by buildings comprises 13,233 square metres (= 15,826 square yards). The rest is made up by a large garden, which forms "vast reservoirs of air." Including the full complement of patients (927), attendants, &c., there are 1,280 inhabitants, with rather more than 70 square metres, or 83¾ square yards, a piece.

The Hospital Gros-Caillou has a total superficies of 16,300 square metres (= 19,494 square yards), of which the buildings occupy 5,579 square metres (= 6,672 square yards). The total inhabitants are 633 sick, and 261 attendants; and, therefore, each person has a little more than 18 square metres (= 21½ square yards).

The grounds of the Hospital of Vincennes have a total superficies of 44.400 square metres (= 53,102 square yards), of which the buildings occupy 5,250 square metres (= 6,279 square yards). It can contain 642 patients, and thus gives 70 square metres (= 83·7 square yards) per head; but as the daily number of sick is usually below 200, the share of the superficies to each patient is really nearly three times this amount. In this hospital there is a special apparatus for ventilation.

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* Revue des Medecins des Armées, December, 1864, p. 661.

Taking the whole period in each hospital, the following has been the mortality:—

		Mortality per cent. of cases treated* (Malades traités).
Val-de-Grâce	(34 years)..	4·445
Gros-Caillon	(34 years)..	4·880
Vincennes	(6 years) ..	2·110

Taking, however, the six last years as common to all the hospitals, the mortality has been:—

Val-de-Grâce	(1858–1863)	3·276
Gros-Caillou	(1858–1863)	2·971
Vincennes	(1858–1863)	2·110

Now, if the cases and modes of treatment were precisely similar, it is evident that some cause is acting at Vincennes to the advantage of the patients. M. Legouest concludes that this is simply that hospitals seated outside a city are more healthy than urban hospitals, and that hospitals which receive a small number of patients are healthier than those which receive a large number.

These conclusions are strengthened by a review of the history of the Val-de-Grâce and Gros-Caillou since 1830. Progressive improvements have been introduced, consisting especially in lessening of the number of patients, and in giving more space and in improving ventilation. The old cloistered buildings have been abandoned, and better wards constructed in the garden, and the custom has been introduced of leaving each ward alternately empty for a month, six weeks, or even two or three months at a time. At the Gros-Caillou some part of the hospital has been rebuilt. In the neighbourhood new boulevards have been opened, sewers have been made, trees have been planted, so that the quarter has been greatly improved; also at this hospital, even more than at the Val-de-Grâce, the system of evacuating the wards frequently has been regularly carried out. The result has been that at both these hospitals the death rate has regularly lessened, and now the Gros-Caillou has a less mortality even than the Val-de-Grâce. But this may be in part owing to the Imperial Guard, who are better paid and better fed than the line, being treated at the Gros-Caillou.

From this analysis the same conclusion can, however, be drawn, viz., that improvement in the supply of air, and increase in the purity of air, from the custom of leaving the wards empty from time to time, has a great effect in lessening mortality.

REPORT ON SUEZ.

By Surgeon Fraser, 10th Hussars.

In view of the intended adoption of the overland route for troops to and from India, the folowing abstract has been made from the Annual Report from the British Military Hospital at Suez, for 1858, prepared by Surgeon Fraser of the 10th Hussars, who was sent to Egypt to organise the hospital during the mutiny in India, and which was closed on its suppression. A recent addendum furnished by Surgeon Fraser is also subjoined, giving his views on the establishment of a military hospital in Egypt.

Topographical Description of Suez.

The town of Suez—situated in lat. 29° 59′ N., long. 32° 36′ E.—is built upon a low sandy tract of land which forms the western bank of a narrow winding tidal creek, in which the north-eastern extremity of that extension of the Red Sea, which receives the name of the Gulf of Suez, terminates.

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* By this term admissions are meant, as appears from the context.

The general level of the town does not exceed 10 or 12 feet above low water, and the nature of the soil on which it is built is such that water may be anywhere obtained within 4 or 5 feet of the surface.

The limits of the town—of irregular form—are enclosed by a defensive wall on three sides. The waters of the creek completed its means of defence on its north-eastern aspect. Its walls, gates, and defences landward, however, are now in a ruinous state, being no longer required as a protection against the incursions of the Sinaitic Bedouin Arabs. A considerable portion of the space thus enclosed remains unoccupied by houses, especially at its north-eastern and south-western extremity. In the latter situation is an open piece of ground which at one time formed the cemetery of the town. The objectionableness of such an arrangement, in a sanitary point of view, had been repeatedly pointed out for many years back; but the prejudices of the people are so strongly in favour of the repository of the dead being as little as possible removed from the habitations of the living, that this ground continued to be used for that purpose until three years ago, when, on the breaking out of an epidemic of cholera, the representations of the Government medical officer of the station at the time were at length attended to, and another established outside the town, and about a mile distant from it. Even then, however, this measure of reform was not carried into effect without much opposition on the part of the people. It had to be absolutely enforced by the interference of the Government, notwithstanding that, after a previous similar epidemic which proved severely devastating to the community, the cemetery of the town had become manifestly the source of fever equally fatal—a fact admitted by the people themselves.

The number of houses in Suez is reckoned at about 800, including Wakálehs or Caravanserais. Some of the latter are buildings of considerable size in the form of square, round an open court, and the natives frequently prefer occupying their upper stories as residences, whilst the rooms on their ground-floor serve as stores for merchandise. So many as between thirty and forty families are thus found permanently lodged in one of these buildings. The houses generally are one story, rarely two stories in height, but a considerable number are mere miserable hovels on the ground. In the former the upper floors alone are occupied as a human habitation, the ground-floor being reserved for store-rooms, and for the reception of poultry, sheep, goats, donkeys, and even a camel occasionally.

The houses are all flat-roofed, built very close, and crowded together, and present almost universally, even the best, a most wretched dilapidated appearance. The Government buildings, and those erected by the Government for the use of the Peninsula and Oriental Steam Navigation Company, and two or three others, are the only exceptions to this description.

The streets are very narrow, and present but here and there a bare approach to regularity.

The creek on which Suez is built bends sharply in a north-easterly direction immediately on passing the town, and stretches some miles beyond it into the desert, forming in its course shallow, muddy salt lagunes of considerable extent. On the south side of the town it expands at high tide* over an extensive low, flat sandbank, presenting then the appearance of a broad open bay, continuous with the Suez Roads, reaching to within a few feet of the town, and encircling nearly two-thirds of its extent. At low water, however, the Bay of Suez is distant about a mile and a half in a direct line and three miles and a half by the creek. The anchorage for the shipping, rarely approachable otherwise than by the creek, may be distant between four and five miles. The creek, though comparatively narrow, is navigable by boats of considerable size at all states of the tide, and embarkation or debarkation is effected with convenience and facility from a wooden pier or jetty erected for the purpose, and alongside which a small steamer of 120 tons burthen can at all times come.

Though bounded by this narrow strip of water on one side, Suez may be regarded as in reality wholly surrounded by barren desert, excepting on its south-western aspect, where it opens towards the Red Sea. There is no cultivation nearer than the valley of the Nile, between eighty and ninety miles distant, and on this source it is dependent for all its supplies of provisions of every kind.

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* The rise of the tide is from four to six feet.

Supplies of Provisions, &c.—There are two points from which these are obtained nearly equidistant from Suez, namely, Cairo and Bulbĕis and its vicinity, and thence a supply could be procured in quantity proportionate to any demand; but at present the demand being but very trifling for all articles of food other than for native consumption the supply is small, irregular, and of inferior quality, and every description of provision is very dear. Even the common brackish water is sold at *6d.* for a goat-skin full—a better quality at 1*s.* The natives, however, are said to live very well after their own fashion.

The price of labour is very high and employment abundant, and the people are in what are considered in this country comfortable circumstances. Such a thing as absolute destitution appears almost unknown, and a case of mendicancy is rarely ever seen. The halt, the blind, and the maimed are provided for by their immediate relatives or friends, and receive no assistance from the State, excepting, perhaps, an occasional donation in the month of Ramadan or Moslem Lent.

Supply of Water.—The great want at Suez is a good supply of fresh water. There are altogether five wells within reach of the place. The nearest is on the road to Cairo, about four miles distant. The rest are distant from ten to twenty, or, perhaps, five-and-twenty miles. The water in all of them contains a large but varying proportion of saline impregnation; that of the well on the Cairo road, the nearest, is considered fit for cattle only, and of the rest, that of only one is considered *perfectly* wholesome.

It is from the latter that the water universally used by the townspeople—natives as well as European, or other foreign residents—is obtained.

It is of a bitter, brackish taste, and apt to derange the bowels on first using it, inducing diarrhœa; but it is regarded by the natives as possessed of peculiarly salubrious properties.

They mention a curious fact with regard to it—that after having been habitually accustomed to its use, on going to Cairo and there drinking the celebrated "sweet water" of the Nile, the latter has the effect of profusely purging them for some days.

The well from which Suez is supplied with this water is at the foot of a low range of hills in the desert on the east side of the Red Sea, at the distance of about 10 or 12 miles. In the same desert, and likewise about 10 miles distant from Suez, but only about a mile and a half from the shore of the Red Sea, there is a small oasis, where there is formed a series of springs, called Moses's wells, the water of which, though bitter and brackish, is potable, but considered less wholesome than that just described. There is a fourth well at the foot of the mountains on the western shore of the Red Sea, distant between 15 and 20 miles.* It furnishes water of about the same quality as Moses's wells. From this last and Moses's Wells the shipping is supplied when they find it necessary to replenish their tanks, as they always do on occasions of long detention here, or of carrying troops, when the supply required is great, and their condensing apparatus of that description (as they almost all are, I believe, at present) which is efficient only when the vessel is under steam and in motion.

The fifth well is said to be between 20 and 30 miles distant in the desert, to the north-east of Suez. Its water is considered by *Suezians* as *perfectly* sweet, but I can state that my own experience of it is that it is very far indeed from being either palatable or sweet. Tea or coffee made with this water always tastes brackish. After a time, however, one does get accustomed to it. It is said by the natives not to be equal in salubrity to that in general use at Suez, and is, therefore, rarely used, but the true reason may be suspected to be its being double the distance off, and accordingly double the price that the other water is.

Though all the water obtainable at Suez is thus seen to be of what is usually considered an inferior or bad quality, yet its effects on the human constitution, judging from the general health of the community, would not appear to be decidedly pernicious, at least not after having become, as it were, seasoned to its use.

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* Since writing this statement, I have ascertained by a personal visit, that this well is called "Abu Deraj," and is distant 35 miles.—T. F.

Climate—Temperature.—The average annual temperature of Suez, according to observations conducted for some time continuously, I believe, and with regularity, by a gentleman resident here for about 20 years, is 67° Fah., the average daily temperature attaining its maximum in August, and minimum in January. The daily range is considerable at all seasons. In the latter month it extends from a minimum of 38° to a maximum of 68°, and in the former from 68° to 102° or 104°. The same authority states that departures from these extremes are rare; that he has never seen the thermometer rise above 108° during the severest "*Khamsin,*" or to have sunk below 34° in the rawest wintry wind.

There is no reason to doubt the accuracy of these observations as such, but so much depends upon the position of the instruments and other circumstances, that, as indications of the absolute atmospheric temperature, they cannot be regarded but as approximately correct, for I have ascertained that in this case no further precautions were taken than simply exposing the instruments in the shade on the house wall.

During the few months of my own residence in the country I have not been able to make meteorological observations of much value, on account of not being provided with the necessary instruments; but from such observations as I have made I have ascertained that the highest range mentioned above was nearly attained even in May, that the daily range (even from morning till evening) is great, and that there may also be a considerable variation from day to day. The full amount of daily range could be ascertained of course only by the use of self-registering instruments, nor could the daily variation be estimated with accuracy excepting in the same way; but that there is a variation from day to day, such as perhaps would not be expected in this latitude, has been observed with sufficient accuracy, though its exact amount may not have been ascertained.

This variableness in the daily temperature, independently of season, appears attributable to peculiarity of position, and liability hence to be affected by local influences of much power, such as the heated sand of the desert, on one hand, and the sea on the other. Even the shallow, extensive lagunes described as lying to the north-east of this place (the coldest point of the wind) may be allowed to have some, perhaps a considerable, influence, for from these and the miles of surface around them left just in a moist state by each receding tide evaporation would be very rapid. A change accordingly from perfect stillness of the atmosphere to a state of motion, and from a state of motion in one direction to another, effects an immediate and usually well-marked change in the thermometer. Instances of this to a remarkable extent have been occasionally observed. On the occurrence of a sudden change of wind to the north in the evening, after having been blowing from the south during the previous part of the day, the thermometer has been observed to stand at 6.30 p.m., several degrees higher than it did at 2 or 2.30 p.m., and thus continuing for two hours or thereabouts at an unusually high range, until the column of air covering the desert has passed by and been gradually succeeded by a cooler mass.

Winds.—By far the most prevailing direction of the wind is from the north, and it seldom blows in any other direction continuously than either northerly or southerly. The period of the prevalence of the southerly wind is towards the latter end of April and during the month of May. It is called the "Khamsin" literally *fifty*. This designation is said to be given to it on account of its occurrence about the season of the Jewish feast Pentecost. By some, however, it is regarded as applying rather to the term of its duration as a prevalent wind continuously; but the designation is, I find, one very loosely applied to any unusually *hot* breeze, from whichever direction it comes. At the same time, on direct inquiry, the "Khamsin" is invariably described as a southerly or south-westerly wind, and to it all kinds of deleterious influences are attributed, and the season of its prevalence is regarded as most sickly. In former years this season was looked forward to with alarm and anxiety as that during which the Egyptian plague used to break out epidemically, and if it did not then appear the people considered themselves safe from its ravages for that year.

This south wind, or "Khamsin," is universally asserted and believed to be by far the hottest. This, however, does not correspond with the indications of the thermometer during its prevalence. At Suez, at least, the highest temperature observed by me as yet has been invariably when the wind was blowing from the north. At the same time it must be admitted that to one's *sensations* the south wind is both the hottest and most oppressive; whereas during the prevalence of a northerly wind the air *feels* cool and bracing, and the spirits elastic, though the thermometer may stand several degrees higher. The cause of this is of course obvious enough in the fact of the northerly wind being dry, thus favouring the more rapid evaporation from the surface of the body, and that from the south being loaded with watery vapour; and likewise of the difference of temperature as indicated by the thermometer, being the natural result of the air passing over an immense tract of heated sand in the one instance, and of water in the other.

Fall of Rain.—The occurrence of rain at Suez is said to be very variable —usually rare. Sometimes years pass without a shower; at other times it pours in torrents for days.

In 1841 an unusually heavy fall of rain took place, and continued for nine days successively, deluging the town, and causing many buildings to fall. The rainy season is during winter and spring. There was a moderately heavy fall for two successive days this last season, and a few light showers at irregular intervals, generally of not many minutes' duration.

This almost total absence of rain is not, however, much felt, as there is scarcely a particle of vegetation for miles and miles, but if it had been otherwise the frequent heavy fall of dew at night would in a measure have compensated for it.

Cloud.—The sky may be said to be invariably clear and cloudless, with the exception of a haze on the horizon in the early part of the day, and a few light, fleecy clouds in the afternoon.

Climate at Different Seasons.

The climate of Suez during the winter and early spring months is to the European constitution most delicious. The air feels pure, keenly cool, and bracing. By some, indeed, it is then considered bitterly and piercingly cold. It is especially so felt out on the desert at night.

Towards the middle of *March* the power of the sun is greatly increased, and begins to be felt much on exposure to his direct rays during the heat of the day, but in the house the air continues still cool and pleasant.

In *April* there are usually some very *oppressive* days, especially when the wind is southerly, but such do not occur for long continuously, and the nights are invariably cool.

May is regarded as most trying both by natives and Europeans. The thermometer attains occasionally an unusually high range, and, as already observed, the weather feels very hot and oppressive during the prevalence of the "Khamsin," or southerly wind, in this month, independently of the range of the thermometer.

In *June* again the climate is pleasant. The air feels comparatively cool. This change is probably owing to the commencement of the heavy falls of rain to which the Nile owes the replenishing of its waters.

The early part of *July* is likewise said to continue comparatively cool, but from that date to the middle or even the end of September the heat is described as being very great. However, notwithstanding this high temperature, the effects of the climate upon the European constitution must be far less injurious, even during that season of the year, than the climate of the tropics; for I can learn of no case, during the last forty years, in which a prolonged residence has proved seriously detrimental.

Population, &c.

As usual in Mohammedan countries, I believe, a strictly correct census is not taken in Egypt, and accordingly the population of Suez is variously estimated. By the Government officials at 6,000; by others at 5,000. According to the former computation it is composed as follows:—

Egyptians	5,700
Levantines	150
Europeans (English, Italians, French, &c.) ..	120
Turks	30
Total	6,000

Twenty years ago the population was supposed to be about 3,000.

After that it rapidly increased until 1850, when a very fatal visitation of cholera is said to have reduced it, perhaps, one-half. It has since again increased. In 1853 it was estimated at 4,800; and though visited by another epidemic of cholera in 1855, it did not prove of long duration, nor fatal to a degree seriously to affect the population.

It is, therefore, considered that the present population may be fairly estimated as not under 5,000.

BIRTHS.

The births during the last five years have been 871.

	Males.	Females	Total.
In A. H. 1269–70	99	102	201
In A. H. 1270–71	93	79	172
In A. H. 1271–72	76	67	143
In A. H. 1272–73	95	91	186
In A. H. 1273–74	102	67	169
Totals	465	406	871

DEATHS.

The decrease by deaths during the same period, including those from the epidemic of cholera in 1855, has been 441.

In A. H. 1269–1270	94
In A. H. 1270–1271	84
In A. H. 1271–1272	114
In A. H. 1272–1273	80
And in A. H. 1273–1274	69
Total	441

In a place like this, which is not only the great highway for intercourse and traffic between the two great western and eastern quarters of the globe, including Australasia, but forms, besides, the chief route for the devout of the Islam world, both in Asia and Africa—from Bokhara, Turkey, and the Crimea, to the very centre of North Africa—on their journey to and fro for the special object of worship at the shrines of their faith at El Medinah and Mecca—the population must at all times be a floating one. It is especially so for several months in the year, during the period at which this pilgrimage is performed; and there is a further floating population at Suez, as a local port, in visitors from the various ports in the Red Sea with which it holds commercial intercourse.

Amongst this floating population both births and deaths occur. The invalid from India, in search of health to Europe too late, not unfrequently just lands to leave his bones here. Sick from the two great Steam Navigation Companies' vessels are landed to die here.

Whole boat-loads of small-pox from the ports of the Red Sea are sometimes landed to die, and all are duly registered in the Government official records, but distinguished under the heads of "*Residents*" and "*Non-residents*." As it would be unfair to reckon the latter in the above, or any statistics that may follow, they have with some trouble been carefully excluded, deaths from disease contracted in the place, and not imported, being considered as alone bearing fairly on its vital statistics.

Duration of Life.—Without reference to actual statistics, I find that the general impression amongst the people is that the average duration of life here, after attaining the age of manhood, must be about 70 or even higher: but as the mass of the population, after a certain period, have only a confused notion of their exact age, this estimate cannot be looked upon but as vague and inaccurate. There is no question, however, that the number of people who attain a great age is very considerable. The mortality is greatest under five years of age. This is mainly attributable to the want of care and enlightened management of that period of life, and the total neglect of proper treatment on the accession of those maladies which are peculiarly incidental to it, or which have been induced by such want of care.

Disease in Childhood.—Disease very frequently at all periods of life, but more especially in childhood, is here either permitted to run its course without any interference whatever, or submitted to remedial measures much more likely to prove pernicious than beneficial, and this notwithstanding that medicines and the advice of a properly qualified medical practitioner are provided gratuitously by the Government, and at all times available. All their afflictions, moral or physical, appear to be regarded with devout submission by the people of this country as the result of the wise decrees of their Allah, and that whatever his will may be, so will their fate, independently of any act of theirs. They are much more ready to avail themselves of medical advice for trivial ailments not involving any risk to life, than for the most serious disease or injury.

Mortality in Childhood.—The deaths in childhood are returned as caused by affections of the brain, convulsions during dentition, gastritis, diarrhœa, intestinal worms, &c.

Vaccination.—The practice of vaccination has been fairly established for some years now. Its benefits are fully appreciated; and although, in the first instance of its introduction, the practice had to be enforced by Government authority, there is now no difficulty in carrying it into effect in all instances. Small-pox is accordingly of rare occurrence amongst the "*Residents.*" On examining the records of the local Hospital over a period of some years, I found that though a large number of cases had been there treated, the disease had been in every instance imported, and occurred in strangers "*non-residents*" from the ports of the Red Sea or India, and that precautions are taken to prevent its spread from such cases.

MORTALITY AT SUEZ.

The total mortality during the last five years, as already stated, was 441, including the deaths from cholera in 1855. A. H. 1271-72.

MORTALITY AT DIFFERENT AGES.

The following Table shows the number of deaths at different ages in each year. The date of the Hegira is retained for the sake of convenience. The period embraced commenced with the month "Shawal," 1269, and ended with Ramadan, 1274, which corresponds with 13th May, 1858.

Died at ages under	5	10	20	30	40	50	60	70	80	90	100	110	Total
In A. H. 1269–70	82	1	..	3	1	..	1	1	..	3	2	..	94
" " 1270–1	68	1	1	1	4	3	..	2	3	1	..	..	84
" " 1271–2	76	10	7	5	4	2	1	1	4	4	..	..	114
" " 1272–3	60	4	1	1	2	2	2	4	1	2	1	..	80
" " 1273–4	44	2	2	1	3	4	4	4	1	2	..	2	69
Total	330	18	11	11	14	11	8	12	9	12	3	2	441

From this Table will be seen how large a proportion of the mortality takes place under five years of age, but I may further observe, that according to the local official returns, the number of deaths in this column occurred chiefly quite in infancy, certainly two-thirds under two years of age.

MORTALITY FROM VARIOUS DISEASES AND AT DIFFERENT AGES.

In the following Table is shown the cause of death at the different periods of life in the total mortality of the same period, according to the same records :—

Assigned cause of death at ages under........	5	10	20	30	40	50	60	70	80	90	100	110	Total
Fevers.........	19	2	..	..	1	1	2	..	..	..	..	..	25
Disease of brain & nervous system.	55	3	2	3	3	2	..	1	..	1	..	..	70
Disease of lungs..	14	1	..	1	1	..	..	..	1	1	..	..	19
Disease of heart..	..	..	..	..	..	..	1	1	..	..	..	..	2
Disease of liver..	..	1	..	1	2	..	..	1	..	..	..	..	5
Disease of alimentary canal..	204	4	4	..	1	2	1	6	4	5	1	..	232
Dropsies.......	5	..	1	1	..	5	3	1	1	1	..	..	18
Disease of urinary bladder.......	..	..	..	..	..	..	..	1	..	..	..	..	1
Scarletina......	1	..	..	..	..	..	..	..	..	..	..	..	1
Measles........	5	1	..	..	..	..	..	..	..	..	..	..	6
Lues venerea....	1	..	..	..	..	..	..	..	..	..	..	..	1
Elephantiasis ..	..	..	..	1	..	..	..	..	..	..	..	..	1
Cholera........	12	6	3	4	2	..	1	..	1	..	..	..	29
Accidents and injuries........	2	..	1	..	1	..	..	..	..	1	..	..	5
Sudden death—cause unknown.	..	..	..	..	..	1	..	..	..	..	..	..	1
Old age and decrepitude......	..	..	..	..	..	..	..	1	2	3	2	2	10
Parturition.....	..	..	..	..	3	..	..	..	..	..	..	..	3
Inanition a few days after birth.	12	..	..	..	..	..	..	..	..	..	..	..	12
Total......	330	18	11	11	14	11	8	12	9	12	3	2	441

MORTALITY FROM DISEASE, &C., AMONGST RESIDENT AND NON-RESIDENT.—AVERAGE RATES OF MORTALITY.—SALUBRITY OF CLIMATE.

The total number of deaths at Suez during the period embraced in the foregoing returns—including all deaths, whether from disease contracted on the spot or imported, that is, including invalids *en route* to or from India, cases landing sick from the shipping in the roads, cases of sickness amongst the pilgrims *en route* to Mecca, and amongst visitors from the ports of the Red Sea, &c., in short, all included in the Government Records under the head of "*Forestieri*," strangers or non-residents, as contradistinguished from "Del Paese" or natives—was 881, or almost exactly double the number recorded under the head of "Del Paese," which alone has been hitherto considered; but taking the mortality which occurred under the latter only, and reckoning the population at the lowest estimate of 5,000, the annual rate of mortality at Suez for the last five years has been 17·64 per 1,000, including deaths from cholera; and exclusive of the latter, only 16·48 per 1,000—a rate which, considering the habits of the people, their badly-constructed and filthy habitations, the total neglect of any hygienic measure, the complete absence of even an attempt at efficient sewerage, must, I think, be allowed to speak well for the salubrity of the climate; and such indeed is the opinion universally expressed regarding it throughout Egypt, so far as I can learn, after somewhat extensive inquiry amongst those who have the best knowledge of it. This, however, is no more than one should have reason to expect, situated, as it is, with the pure invigorating air of the desert on the one side, and that of the sea on the other, removed from all external noxious influences, and blessed with a dry and ever-changing atmosphere, to counteract those which might arise within its walls through the ignorance, indifference, or barbarous habits of the people.

Endemic Disease.—The prevailing endemic diseases are said to be fevers of a typhoid and occasionally intermittent type, dysentery, diarrhœa, and ophthalmia; but, judging from the statistics given above, and considering that, as regards remedial measures, they are left in such a large proportion to run their course without any interference, or with interference little likely to prove beneficial, namely, domestic treatment or that of the ignorant native Hakim, they cannot be regarded as in great proportion assuming a very grave type. In fact, the place is considered by the local medical authority as enjoying a remarkable immunity from endemic disease of any kind.

Fevers.—Fevers are said to occur chiefly in the spring, when strong northerly winds cause the waters of the creek to recede, leaving exposed a considerable extent of foul smelling mud, saturated with the ordure of the town. In October and November febrile attacks are said again to prevail, and then to present their gravest type.

Diseases of the Alimentary Canal.—Diarrhœa and dysentery appear in the beginning of summer, but more especially in autumn.

In one of the Tables already given in the preceding part of the report by far the greatest mortality appears under the group "*Affections of the alimentary canal.*" In the records from which that Table is made up, these are described as being diarrhœa, dysentery, gastritis, enteritis, gastro-enteritis *aphthæ*, and tabes mesenterica, but a much larger proportion appears under the heads of diarrhœa, *aphthæ*, dysentery, and tabes mesenterica; their order of frequency relatively, as a cause of death, being that in which they are now named; and in the vast majority of instances these diseases prove fatal in infancy or childhood, that is, under five years of age.

Though no case appears under that head, the irritation of intestinal worms is frequently assigned as a cause inducing fatal disease of the bowels.

Cholera.—Cholera has been always distinctly traced to importation, and has been in every instance brought by the pilgrims on their way either to or from Mecca, but in one instance only *from* Mecca, and that on the first occasion of its general spread from the East in 1830. In late years its course has been invariably from Alexandria to Cairo, and thence to Suez.

Ophthalmia.—Ophthalmia is regarded as less prevalent here than at Cairo, and likewise less severe and less destructive in its results; but, judging from casual observation amongst the people, the disease must still be very common indeed. One scarcely ever sees an adult of the lower class, or indeed of any class, in whom both eyes are quite free from traces of former disease; and one sees a large proportion blind of one eye, and many totally blind. The disease is not considered contagious or infectious by the people of the country. It is said to prevail at certain seasons more than others—as in the beginning of summer—and in some years to occur as a virulent epidemic. It appears usually to be little regarded by its subjects, in much the same degree apparently that a common "cold in the head" would be in England. Hence probably the disastrous results—as regards both vision and organ, so frequently observed, which must, I should think, in the great majority of instances, be attributable rather to neglect and mismanagement than the actual virulence of the disease.

Phthisis.—Phthisis is said to come seldom under observation as originating in Suez, but that in cases in which the disease had become developed before residence, it appeared to run a rapid course.

I do not know, however, that this is an observation much to be depended upon. Phthisis is just the form of disease in which I should expect a native would never think of seeking medical advice, excepting at its terminal, or more rarely, its acutest stage, and accordingly little likely to come under frequent observation, unless at so advanced a stage that its further progress must appear very rapid.

I know of one case myself in which hæmoptysis from pulmonary tubercle has taken place repeatedly over a period extending to nearly three years, and, though much emaciated and weak, yet at this moment the man enjoys moderate health; has, in fact, during the last few months, gained greatly in flesh and strength, notwithstanding that the graver symptoms of the advanced stages of the malady had been present.

This *one* fact is of course not of much value, but I deem it worthy of mention as bearing upon the consideration of the suitableness of the locality as a resort for invalids from pulmonary disease.

I may likewise mention, as bearing upon the same point, that I am on every hand informed that catarrhal affections and cough are very rarely observed amongt the people, and that they are of a very trifling description when they do occur, seldom requiring any other than domestic treatment, such as it is.

It will be further observed that the proportion of deaths from pulmonic disease during the last five years, as shown in a preceding part of this report, is very small.

Plague.—The plague may, I am informed, be now considered extinct in Egypt. This very desirable result is attributed chiefly to the sanitary arrangements and measures of a Board of Health, established under Government now for some years.

Scarlet Fever, Measles, &c.—Scarlet fever, measles, and whooping-cough appear every few years at Suez in an epidemic form, but seldom prevail long, and the symptoms are usually of a mild type.

BRITISH MILITARY HOSPITAL.

The British Military Hospital was opened in Suez on the 11th December last, in a small house on the south side of the town facing the sea, the use of which was obtained temporarily until a more suitable building could be procured, but sick had been under treatment in an apartment in the Suez Hotel from the 7th December.

The present house was at length reluctantly fixed upon for the permanent hospital.

It was in an extremely dilapidated state, and in many ways objectionable; but, in point of extent of accommodation, was the only one even approaching suitableness available; in fact, the *only* house then *unoccupied* in Suez. It had been originally merely a private dwelling, constructed according to Arab ideas of comfort and convenient arrangement of apartments. The ground-floor, as is usually the case in this country, was devoted to store-rooms on either side of an open court. The inhabited part of the house, namely, the first-floor, consisted of six rooms and a kitchen—the latter containing also the *common privy* of the establishment, which was merely a tube of stout masonwork two feet square, extending to the ground-floor, where it was again made available for a similar purpose for the menials, and thereafter communicating with a cesspool, which was *supposed* to be opened and cleaned out periodically.

It is unnecessary to enter into any detail to show what was necessary in the way of alterations and repairs to this building, as it would be impossible by description to convey any idea of it.

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RECENT ADDENDUM OF SURGEON FRASER.

As in the event of the route through Egypt being permanently adopted for the transit of troops to and from India, the establishment of an hospital at some point in its course would become a necessity, it may not be out of place that I should add now a few observations as to the most eligible locality for such a purpose. This could be at one or more of three places only, namely, at Alexandria, Cairo, or Suez. At first sight it might appear that an hospital would be required at each end of the line—the points of debarkation on each side of the Isthmus—and doubtless such an arrangement would be a convenience, but not, it seems to me, absolutely necessary. One good hospital would, I think, be found sufficient for all possible requirements, and Cairo offers so many advantages that it may be worthy of consideration whether the drawbacks arising from its distance from the point of debarkation for troops from India at Suez, could not be overcome.

Alexandria is a very undesirable place to leave invalids at. Its climate is not good. Surrounded on every side by water: on three sides by the Mediterranean, and on the fourth by the lake Mareotis, its atmosphere, as might be expected, is largely charged with moisture, and even before the sun is quite set dew begins to fall, and prolonging one's ride or drive until dusk is regarded as anything but prudent. Here those very diseases for which Europeans are removed from a tropical climate are found to prevail—fevers, diseases of the bowels and liver. For these reasons it is only in cases of absolute necessity that I would think it advisable to leave a sick man at this station, and I believe that such need but rarely arise in the case of troops *en route* to or from India. Troops coming from England could most conveniently leave their sick at Malta, where hospital accommodation is ample, and as the time occupied in the passage from Malta to Alexandria would not under any, or at all events under ordinary, circumstances exceed three days, the proportion of casualties, even from a large body of troops, could be but small, and not at all likely to be of a number to render necessary the establishment of an hospital at this point expressly for them. Transports employed in such a service may be presumed to be well provided with proper accommodation for sick, and it would in the great majority of cases be no hardship, nor add to the sick man's discomfort or risk to remain on board and be conveyed back again to Malta, there to be taken into hospital, instead of at Alexandria. It must be admitted, however, that there is always a *possibility* of an occasional emergency occurring, of such a nature as to make a sick man's removal from board ship to an hospital on shore most advisable, if not absolutely necessary. For such emergencies I believe ample provision could be made by the hospital for Europeans already established at Alexandria, under the admirable management of some "Sisters of Charity." I do not know how the institution is supported, but I believe it to be in considerable measure, if not wholly, by public subscriptions or voluntary contributions from the European residents there. During the late transit of our troops through Egypt, a few beds were most readily and willingly placed at our disposal for their use in this hospital, and I have no doubt that by making a suitable subsidy to the funds of the hospital, a number of beds could be secured and reserved permanently, sufficient to meet any possible emergency of the kind in view. Again, for troops coming from India, the seriously sick or men unable to continue their journey would be left at either Suez or Cairo, whichever might be selected as the most suitable locality for an hospital for that end of the route, and the time that elapses in the passage between either of these places and Alexandria is so short, that for them likewise provision need be contemplated but for emergencies only. Thus it does not appear to me that the establishment of an hospital at Alexandria for the use of troops passing through Egypt to or or from India, is either advisable or need be requisite.

Now to go to the opposite extremity of the journey through Egypt. There an hospital at some point is absolutely necessary, and that must be one easily accessible to invalids arriving from India. Suez, the actual point of debarkation, is so. It further possesses the advantage of (considering its latitude) a good climate during the greater part of the year. Its air is pure, dry, exhilarating, and bracing, notwithstanding a great daily range of temperature at all seasons. It is also free from all sources of malaria—all greatly in its favour as a site for an hospital.

In every other respect the locality is most inconvenient for such a purpose. The first difficulty that would present itself would be obtaining a suitable building, and that in Suez would be found impossible. With the exception of the old hotel, there is not such a thing in the place, and that would of course not be available. Then if a building has to be erected for the purpose, as it certainly would need to be, the whole of the materials—even the mortar and water to mix it with*—must be transported from Cairo, some 90 miles off, and that, when the extent of accommodation that would be requisite for an hospital, even on a small scale, is taken into consideration—that it must be not only sufficient for sick, but the general staff of the hospital besides—will be seen to be an undertaking of no small magnitude, and by no means easy of accomplishment. All supplies too, meat, poultry, vegetables, &c., must come from the same source. Nothing whatever in the shape of food for man or beast is procurable at Suez, except what is imported, and that used to be of a most inferior description and at a most exorbitant price; but with the increase of the European population, and the greater facility of communication with Cairo, it may be different now: at all events in the former respect an improvement may be expected.

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* Mortar mixed with salt water takes many months to dry—if not years to do so thoroughly.

There is now, I understand, a fresh-water canal, so called, open from the Nile to Suez or its neighbourhood, but whether the supply furnished thereby is ample for the requirements of, and free to the whole community, and would be available and sufficient for the requirements of an hospital as well, I am not able to say. If it is, there would be one great difficulty in making provision for an hospital at Suez removed. Failing that, an apparatus for distilling salt water would be the only resource, and though the quality of the water produced in this way by the best form of apparatus is sufficiently good, the supply must be always comparatively limited. Still, notwithstanding all these disadvantages and drawbacks, it may be urged that there are other considerations which should be regarded of such paramount importance as to necessitate that these should be set aside, and that therefore Suez *must* be the point at which an hospital for the use of troops passing through Egypt, more especially from India, should be established.

In that case it comes to be considered what the best structure for such a purpose in this locality would be, and I think there can be no question that a good stone building would be the best—if the Egyptian Government will permit the erection of such—which I know they at one time would not. It would in the end probably be the most economical also. Property of that kind will be more likely to increase than diminish in value, on account of the daily increasing importance of the place, being already the meeting point of several great undertakings, and to all appearance destined to become, if not the only, the chief great highway between the two great divisions of the Old World. Next best to a stone building would be wooden huts, of the size of the better class of hospital huts at Aldershot, or even larger, but constructed specially for the country and climate, with spacious verandahs, and suitable contrivances for keeping out heat, glare, sand, and flies, or at least for diminishing as much possible the evils and discomforts arising from these. In their construction, too, the custom of the country might be followed with advantage in the adoption of flat terraced roofs. These would prove a convenient and pleasant resort for convalescents, for an airing morning and evening. The method of ventilation in use in the country is likewise worthy of imitation. In addition to windows and Venetian doors, houses are ventilated thoroughly by a large erection in the roof called a Malakhoff. It opens towards the prevailing direction of the wind, and causes a thorough draught through the houses night and day. It is equivalent to a windsail, and being well raised, receives fresh pure air.

In a country where it so rarely rains, I think wooden huts would be found to last a great number of years; and they possess the further advantage of being capable of construction in all their parts in England, to be put together on arrival at their destination, instead of having to trust to the very dear and very inferior class, both of artizans and materials, procurable in Egypt. They should, however, be erected on a foundation of stone, and raised some feet from the ground; or if possible, a site should be selected well raised above the general level. Within the walls of Suez, or anywhere in its immediate vicinity, water is found within a few feet of the surface—in many places, within not more than three or four feet; and I have observed that when the surface is covered from the sun for a short time, it looks and feels quite damp, and for that reason it is, I imagine, that one never sees the ground floor occupied by any one who can afford to build an upper story.

I may as well observe here, that if hospital buildings are erected in the desert, outside the walls of Suez, and I think it is impossible they can be inside, that it will be necessary that they should all be enclosed, for protection against the encroachments of pariah dogs, and, as I have been told, against those of wolves also; and not improbably some such protection might likewise be necessary against thieves.

A ship anchored in the vicinity of Suez has sometimes been thought of and suggested as a convenient resource for use as an hospital, and if it could be placed within a moderate distance it would, perhaps, offer greater facilities than any other plan in such a peculiar locality—but that it cannot be. If I remember rightly, the nearest a vessel of a suitable size could lie is about five miles, that is by the channel by which a boat passing backwards and forwards must go. The distance might be shortened at full tide sometimes, but usually not much. Traversing this distance to and fro for the purpose of providing daily supplies, &c., would take a great deal of time, and be found a great inconvenience, not to speak of the occasional *impossibility* of a boat coming on shore at all, on account of the heavy sea that runs during a heavy gale, or even a strong wind. I have no doubt, however, that such a plan would be practicable, but it would be necessary to have a naval or military officer in command, and a sufficient crew of seamen as well as a hospital staff; and to arrange for the provision of supplies in such a manner as to be wholly independent of the shore, excepting periodically, by having a butcher, baker, &c., and live stock, and a supply of fresh vegetables always on board. But it is not a plan that I should at all recommend. Supposing it convenient and unobjectionable in every other respect, I should regard the confinement on board ship as anything but conducive to the restoration of health in men unaccustomed to that mode of life, and who would be constantly yearning for shore, however comfortable they might be made otherwise on board ship. Even the attendants would, I fear, find such a mode of life intolerably irksome. I found it a very hard matter to make Suez, with its very limited resources for variety and amusement, tolerable to them—or I should rather say, that I found it quite impossible to do so. The majority of them became quite uncontrollable. Confinement on board ship, though varied by even a daily trip on shore, would, I think, be found worse.

A large double-walled tent has also been proposed for the purposes of an hospital at this station, but that I could think of only as a last resource, even as a temporary measure. Besides being most uncomfortable for many reasons arising from local peculiarities, it would be found unsatisfactory in a sanitary point of view. In the desert, the air is very keen at night at all seasons, and in the winter months the cold—that is the *feeling* of cold—is the most piercing, *penetrating* I ever experienced. My impression is that a tent could be very little if any protection against it. This could not but prove certainly prejudicial to Indian invalids, whatever form of disease they might be labouring under. The closeness of the water to the surface, too, as already described, would render a tent, on such ground, very unfit for an invalid, and further, it would be impossible to keep the sand out, and that horrible torment, the flies, still a grievous pest in Egypt.

The only other place at which an hospital could be established along the route through Egypt, namely Cairo, would be by far the most eligible situation in point of local advantages, provided a suitable site could be obtained at some little distance outside the city, on the verge of the desert. Failing to obtain a building sufficiently appropriate for the purposes of an hospital, there should be no difficulty in procuring both labour and materials for erecting one *de novo*. The supply of water of an excellent quality is unlimited—the far-famed sweet waters of the Nile. Every description of provisions—meat, poultry, milk, flour, and a variety of vegetables, is procurable in abundance; and the climate is salubrious. The temperature is more equable than at Suez, but the air is not considered as possessing the bracing, exhilarating properties of the more pure desert air of the latter. Nor can it be regarded so wholly free from sources of morbific influence. At Cairo, as the overflowed waters of the Nile recede, the drying surface of the flooded country must, at that season, prove a source of malaria more or less; and then fever and bowel complaints are said to prevail to a certain though not to a great or serious extent, or to affect its character for salubrity generally. So far as I could ever learn, the climate of Cairo was esteemed by all Europeans who had any continuous experience of it, as not at all seriously injurious at any season; and in the winter seasons we know what a favourite resort it is, and how highly commended for a certain class of invalids from this country.

The great objection to it as an eligible situation for an hospital for sick of troops en route to or from India, is its distance from the points of debarkation on either side. This would not signify as regards Alexandria. As already pointed out, there need be no difficulty in providing for men arriving there sick; but in the case of invalids landing at Suez from India, the cases are more likely to be of a serious character, and their condition might occasionally be such as to make it unadvisable, if not impossible, to remove them any farther, by the *ordinary* means of transport at least. I conceive it would be possible, however, so to construct and fit up expressly for such cases a railway carriage, as to make it as easy and safe for a sick man as on board ship, or rather much easier than that is in a sea of even moderate roughness,—a carriage in which he would run no more risk than he would in being removed from board ship on shore—nor, indeed, so much; so that if he were in a condition to bear that without risk, his farther removal thereby might be undertaken with safety. And the railway at Suez, from coming quite up alongside the landing place, offers peculiar facilities for the transference of sick men from the boats to its carriages.

If this difficulty could be satisfactorily overcome, and it seems to me by no means insurmountable, Cairo offers so many advantages as a situation for an hospital over Suez, and so many difficulties would be avoided by adopting it, that I would beg to suggest, as well worthy of consideration, the possibility of overcoming the objections to it arising from its distance of three or four hours by rail from Suez.

REPORT ON LIEBIG'S "EXTRACTUM CARNIS."

By E. A. Parkes, M.D., F.R.S., Professor of Hygiene, Army Medical School.

The Director-General being desirous that Liebig's "Extract of Meat" should be chemically examined at Netley, and should be tested in respect of its nutritive powers, some experiments have been made on this food.

I. Chemical Examination.

The "Extractum Carnis" is a brown, viscid, semi-fluid substance; it mixed readily with warm water, and formed a nearly clear solution, which had a very pleasant taste, and a strong acid reaction, which might be due either to free lactic acid, or to acid phosphates. The degree of acidity was equal to what would be given by 4·26 grains of lactic acid ($C_6H_5O_5 + HO$) in every 100 grains of extract. When this free acidity was neutralized, the savoury taste was lessened, but was not altogether lost.

When the food was dried and incinerated, it gave, as in the case of fresh meat, an extremely alkaline ash. This can only depend on the destruction of an organic acid (in all probability lactic) during the incineration. When the alkali of the ash was neutralized with standard oxalic acid, it was found to be equal to 1·917 grains of soda (NaO) in 100 of food; the combined lactic acid ($C_6H_5O_5$) must, therefore, have amounted to 5 grains per cent.

The following was the composition of the specimen I examined:—

Water		15·084
Organic matter, insoluble in ether, and destroyed by incineration (this includes probably some free lactic acid)		58·869
Organic matter, soluble in ether and destroyed by incineration (includes perhaps some free lactic acid)		3·210
Combined lactic acid, calculated from the alkalinity of the ash (= 5 grains less 1·363, weighed as carbonic acid in the ash)		3·637
Fire-proof soluble salts—		
Phosphoric acid	4·782	
Sulphuric acid	1·263	
Chlorine	1·682	
Potash	1·993	
Soda (calculated)	4·972	
Carbonic acid (calculated from the degree of alkalinity)	1·363	
		16·055
Fire proof insoluble salts, chiefly phosphate of magnesia (= ·916 PO_5) and a little phosphate of lime, iron, and silica)		3·145
		100·000

When the food was dried and burnt with soda-lime, the nitrogen was found to amount to 11·94 per cent. of the dried food, and 10·14 per cent. of the moist.

As to the nature of the nitrogenous matters, no investigation was made. Liebig has already stated that they consist in part of creatine and creatinine, but the amount of these substances has not been determined, and may be small. A substance precipitated by heat and nitric acid from the solution exists in some quantity. The nitrogen corresponds to about 63·88 grains of the albuminous matters of meat, if it exists in this form.*

The amount in one ounce (437·5 grains) of the extract would be (if the free acidity be considered to be lactic and the destroyed organic acid is also lactic):—

	Grains.
Nitrogen	44·86
Phosphoric acid	20·92
Potash	8·72
Lactic acid	40·51

The following conclusions may be drawn from the chemical examination.

The extractum carnis is, of course, not a perfect food; it contains very little if any fat, and no starchy substance. But in respect of three very important dietetic substances it is a food of singular value.

1. *The Nitrogen.*—Admitting (what further observations make probable) that the nitrogenous substances in the extract are capable of being absorbed and applied in nutrition, Liebig's food is the richest in nitrogen of any formerly examined known to me. The Prussian Carniset (see Army Medical Report for 1860) only contains 5·6 per cent.; common undried bread only contains from 1 to 1·5 grains of nitrogen in 100; fresh meat contains about 2·4 grains, or 10·5 grains in one ounce; if meat is *thoroughly* dried (which cannot be done if the meat is afterwards to be cooked and eaten), 100 grains would contain 9·6 grains of nitrogen.

It is, therefore, evident that no substance which can be easily used in cooking is known which contains, in 100 grains, anything like the amount of nitrogen contained in the extractum carnis. The doubts which have been expressed of its nutritive value have arisen apparently from the unfortunate mode of stating its nutritive value, which has been used by those who have brought it into the market. As I understand Liebig's expression, he merely meant to express that 1 ounce is derived from 32 ounces or 2 lbs. of meat, not that it is equal in nutritive value to 2 lbs. of meat. Naturally, when its composition is known, it is seen that 1 ounce is, as far as the nitrogen is concerned, equal to only about 4 ounces of fresh meat, containing 75 per cent. of water, and 15 of dry albuminates, and not to 32 ounces.†

The following Table may assist in prescribing this substance.

If the extractum carnis is to be the only vehicle for the supply of nitrogen (which will seldom be the case, as bread, &c., will always be also given), and if we assume that 2 ounces of albuminates are necessary for mere subsistence diet (to use Playfair's phrase), 4½ ounces for ordinary labour, and 5½ ounces for extreme labour, then the amount of extractum carnis should be in 24 hours—

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* Since this analysis was made Dr. Apjohn, of Dublin, has published an analysis ("Dublin Medical Press," August 2, 1865):—

The amount of nitrogen in the *dried* substance is given as 11·53 per cent; the water was found to be 18·52 per cent; the salts, soluble and insoluble, in the undried substance amounted to 21·396 per cent. The potash was in much greater amount, and the soda was in smaller amount than in my specimen.

Dr. Hassall has also published an analysis ("Lancet," July 8, 1865):—

The water amounted to 18·2, the salts to 21·25, and the organic (fire-destroyed) substances to 60·55. The nitrogen was 8·42 per cent.

† Hassall has pointed this out very clearly, but in indicating its relative nutritive power, he seems to me to underrate the real value of this concentrated food.

	Ounces of Extractum Carnis, in Round Numbers
(*a*). Subsistence diet (= 2 ounces of albuminates = 188·28 grains of nitrogen)	3
(*b*). Usual work diet (= 4½ ounces of albuminates = 312 grains of nitrogen)	7
(*c*). Hard work diet (= 5½ ounces of albuminates = 383 grains of nitrogen)	8½

2. *The Salts.*—As with the nitrogen, so with the salts, no article of food is known to me which contains so much of those salts essential to nutrition (phosphates of potash, soda, magnesia and lime, chloride of potassium, iron) as the extract. Compare again the Carniset, which contains only 8·8 grains of salts, whereas the extract contains nearly 20 in 100 grains. And these salts are especially those needed in many illnesses. The extract may supply them indeed in almost too large an amount, but then we know that the system easily disposes of these salts, and that excess in their supply is not attended with the same bad consequences as excess in the supply of nitrogen.

Assuming that a healthy man would requre about 50 grains of phosphoric acid and 40 of potash, then 2½ ounces of the extract would supply the former, and 4¾ ounces would supply the latter.

For a sick man then about 3 ounces of the extract would supply enough phosphoric acid and enough nitrogen for a subsistence diet.

3. *The Lactic Acid.*—By means of the extract a very great amount of lactic acid is passed into the body, and there decomposes into carbonic acid. Although we do not fully understand the acid of this acid in nutrition, we know it to be highly important; it is not only anti-scorbutic to some extent, but it evidently aids both primary digestion and subsequently the aeration of the blood. In this way also Liebig's extract must be considered as highly important.

Such, then, are the conclusions which may, I believe, be drawn from the chemical examination; I now pass on to the second part of the inquiry.

II.—PRACTICAL TRIALS.

These trials have not been yet so extensive as I should wish, and I propose to hereafter repeat them.

The extract is very pleasant to the taste, and for many days, at any rate, does not cloy on the appetite. It is evidently very readily absorbed, and it removes the sensation of hunger. In all our trials at Netley, even small quantities produced a feeling of support and vigour, which ensued very soon after it was taken. Several of those who took it expressed their sensations by saying that it stimulated them, and one friend, who tried it several times, and compared its effects with those of hot whiskey and water, after coming in tired and wet from yachting, assured me that its stimulating and invigorating effects were superior to those of the spirit.

These facts are quite in accordance with those noted by the Austrian surgeons, who have found it, when mixed with wine, singularly restorative in the shock and collapse produced by wounds. It seems in this way particularly suited for cases of debility of all kinds, especially in the latter stages of fevers, in hæmorrhages, &c.

So marked is this effect that I cannot but surmise it must be applied in nutrition, especially to the repair of the nervous tissues, in the first instance at any rate.

It never produces any nausea, or uncomfortable feeling, or diarrhœa.

Two gentlemen at Netley, Mr. S. and Dr. de C., undertook to live on it and an allowance of bread.

Unfortunately, its composition not being known, it was given in too small a quantity, and the diet was defective from deficiency of fat and starches. Still the trials are instructive.

1. *Mr. S.*—This gentleman is well adapted for such experiments, which are not new to him. His usual diet contains at least 6 ounces of dry albuminates and 4 to 4½ of fat. His health is perfect. He took for 4 days ½ ounce of the

extract, ¼ ounce of salt, and 16 ounces of bread as the only food, and drank only water. This amount of food was given him, as it was supposed to be equivalent to 1 lb. of meat and 1 lb. of bread, the ration issued at first to the soldier in the Crimea.

During these four days his health was excellent, but he lost weight, and on the fourth day (the loss of weight having been 3 lbs. in the last 24 hours) he felt weak and giddy at times during the day. The following table gives the weight and the ureal excretion in these four days :—

	Weight. lbs.	Urea in 24 hours in grammes.
1st day, May 29th	173¼	31·97
2nd day, May 30th..........	173	36·65
3rd day, May 31st	172½	32·45
4th day, June 1st	169½	27·15

It was apparent that this gentleman was being nourished by his own tissues; although he felt strong, it was clear that he was losing ground; there was some irritability, and signs of the system being a little wrong in its nutrition.

A change was now made in the diet; the extract was increased to 1 ounce, the bread to 24 ounces, the salt to ½ ounce, and 5 ounces of rice and 2½ ounces of butter were added.

The effect of this change was immediate. The spirits at once improved; the strength fully returned, and a great deal of exercise was taken; the amount of food seemed too great, and on one day all the bread could not be taken. The weight increased—

	Weight. lbs.	Urea in grammes.
5th day, June 2nd	169	34·92
6th day, June 3rd	169¾	33·60
7th day, June 4th	169½	
8th day, June 5th (ordinary diet)	170½	

2. *Dr. de C.*—This gentleman is less adapted for such experiments, as his health is not perfectly good. Three years ago he suffered from severe fever at Malta, and has since had obscure malarial attacks. At the time of commencing the experiments he was unwell, felt weak, and had some bilious diarrhœa.

He commenced with the same diet, viz., ½ ounce of extract, 16 ounces of bread, and ¼ of salt. This was not only quite insufficient for him, but it was plain that the food was wanting in the essential elements of nutrition. Whereas Mr. S. merely lost weight very slowly and appeared in perfect health, Dr. de C. became at once still more unwell; he felt weak, cold, and sleepy; had headache, with constriction across the eyes; inability for any continued mental exertion, and a general feeling of being "below par." There was considerable thirst.

At the same time there seemed to be evidence that besides the mere want of food, there was some impediment to nutrition and tissue charge. The bilious diarrhœa ceased, and was succeeded by constipation. The urine greatly decreased in amount, and the urea also lessened, though not very greatly. At the same time the body actually gained in weight, no doubt from deficient excretion of water by the kidneys and bowels, and from lessening of the solid excreta.

	Weight in lbs. uniform.	Urine in CC.	Urea in grammes.	ClNa in grammes.
1st day, May 30th..........	178	—	—	—
2nd day, May 31st..........	178½	700	25·44	8·19
3rd day, June 1st..........	178¾	700	25·44	8·518
4th day, June 2nd..........	179½	700	23·52	9·828

The diet was then changed by the addition of fat and starch; 2½ ounces of butter, and 5 ounces of rice being added. The nitrogen was increased by augmenting the extract to 1 ounce, and by adding, as in the former case, 8 ounces of bread. The salt was increased to half an ounce. The effect of this alteration was remarkable, and evidently depended simply on the addition of the fat and starch. The headache lessened; the spirits at once improved; the sleepiness and chilliness went off; strength returned; the urine increased in amount; the constipation continued, however, for two days more, and then disappeared. The weight continued still to increase for two days, then declined, while the urine and urea and ClNa were largely poured out.

	Weight in uniform.	Urine.	Urea.	ClNa.
			in grammes.	
5th day altered food	182¼	870	28·08	14·08
6th day „	182¾	1350	33·75	23·693
7th day „	181	1750	38·500	30·224
8th day „		1585	34·87	25·49
9th day „	179¼	1700 (?)	32·3 (?)	29·84 (?)
10th day „	179¼			
11th day „	179			
12th day „	178			

Ordinary diet was resumed during the last four days. In this case it seems probable that the effect produced in the first four days was owing to insufficiency and bad composition of food, coinciding with what was really a diseased condition of the body before the experiment.

But when simply fat and starch were added to the food so as to give all the elements of a good diet, health was at once restored, and Liebig's extract was then evidently used in nutrition.

The case is particularly interesting, as showing the vast effect of diet, and pointing out to us how careful we ought to be in calculating the diet of our patients. It is not so instructive as the former experiment in illustrating the nutritive power of Liebig's extract in health.

3. *Experiments in Disease.*—Dr. Fyffe has given Liebig's extract to one case of diabetes and phthisis. It was an advanced case, and the man was fed also on bran biscuits, eggs, and butter. The patient took during the day 1½ to 2 ounces of the extract.

He said the extract gave him great support; took away in great measure his voracious appetite, and strengthened him. So great was the effect that he declared it was going to cure him.

In about five days he got tired of his diet, not of the extract, but of the bran biscuits, and begged so hard to return to ordinary diet that he was allowed to do so, and the extract was discontinued.

The amount of urine and sugar lessened, but as he was deprived of starchy food no conclusion can be drawn from this.

It appears, however, that in this advanced case the stimulating and supporting effect of the extract were well marked. Its effects in lessening the voracious appetite makes it indeed desirable to try its effects very fully in diabetes.

If opportunity offer I hope to give a supplement to this paper next year, with further practical trials.

In conclusion, I believe the extractum carnis to be a very valuable food for giving nitrogen, salts and lactic acid, and if its composition is studied, and its combinations with other food properly made, it will, I believe, be extremely valuable in disease.

For the military surgeon it is likely to be very useful in active service, not only for the wounded and sick, but for healthy men. Its small bulk, ease of cooking, savoury taste, and great restorative action, would make it most useful in rapid expeditions. As a breakfast before action, as a few minutes would prepare it, it would be invaluable, or it might even be eaten cold, and as a restorative during exhausting fighting. If cooked flour and butter be mixed with it, it might be used for many days.

It is no doubt an expensive food, but in such conditions as those just referred to, that is a matter of no moment.

REPORT

OF THE

MEDICAL BRANCH FOR 1863.

BY

THOS. CRAWFORD, M.D.,

STAFF SURGEON,

HEAD OF THE MEDICAL BRANCH.

TO THE DIRECTOR-GENERAL

OF THE

ARMY MEDICAL DEPARTMENT.

SIR,

I HAVE the honour to submit the Annual Report of the Medical Branch of the Army Medical Department for the year ending 31st December, 1863.

Officers of the Department.

On the 1st of January, there were 1,022 Medical Officers on full-pay, 11 Officers were brought in from half-pay, and 54 gentlemen were commissioned as Assistant-Surgeons during the year. There were during the same period, 18 deaths, 9 resignations, 10 retirements on permanent, and 8 on temporary half-pay, and 3 Officers were dismissed the service, so that on the 31st of December, 1863, the number on full-pay was 1,039.

A List of the Officers of the Department, corrected to 31st March, 1865, will be found at page 622.

Medical and Surgical Transactions.

Dr. Muir, C.B., Inspector-General of Hospitals, and Principal Medical Officer in Canada, has communicated a lecture "On the Rational Treatment of Pneumonia," delivered at a meeting of the Army Medical Society, Montreal. Such summaries are of great interest and importance; and few professional men have better opportunities for making them than the Principal Medical Officers of the British Army employed in the Colonies.

The Medical Section embraces, in addition, articles by Professor Maclean, Surgeon-Major Massy, Staff-Surgeon Davidson, and others, including an interesting and suggestive paper on the treatment of Cholera, by Assistant-Surgeon Hensman, 20th Regiment, serving in Japan.

In the Surgical Section will be found four articles by Professor Longmore, Deputy Inspector-General of Hospitals, viz.:

On the probable Surgical effects in battle, in case of the employment of Projectiles of a more elongated form, such as the Whitworth Projectiles.

Report on the fitness for use in the British service of a wheeled ambulance transport conveyance, moved by hand labour, with illustrations.

Remarks on a new method of treatment for rapidly healing gunshot wounds; and

A series of cases of resection of the shoulder-joint, with illustrations.

Staff-Surgeon Thomas Moorhead, M.D., has contributed ten cases of stricture of the urethra, cured by Mr. Holt's method of treatment; and several other cases will be found in this section, illustrative of the diseases met with in Military practice, and the method of cure adopted by Military Surgeons.

Army Medical School.

Under this head will be found a short statement relative to its removal to Netley, and the report of the sixth, seventh, and eighth sessions, with the combined results of the several competitive Examinations, and lists of the Candidates arranged in the order of merit.

A notice of the completion of the monument erected at Netley in memory of the Officers of the Army Medical Department, who died during the war with Russia, has been added to this section.

CIRCULARS, &C.

The *Circulars*, *General Orders*, and *Memoranda*, affecting the Officers of the Medical Department, issued between 1st January, 1864, and 31st March, 1865, are reprinted in the order of their issue, and the articles of the Geneva Convention, on the subject of the amelioration of the condition of the wounded in Armies in Field, being of general interest to Medical Officers, are appended.

A general *Index of Contributors* to the five volumes of Reports which have been issued and presented to Parliament has been compiled, and appended to this volume, in order to facilitate reference.

I have the honour to be,

Sir,

Your most obedient humble servant,

THOS. CRAWFORD, M.D., *Staff Surgeon,*
Head of Medical Branch.

Army Medical Department,
5, Whitehall Yard, July, 1865.

MEDICAL REPORTS FOR 1863.

ON THE RATIONAL TREATMENT OF PNEUMONIA.

A Lecture, by W. M. Muir, Esq., M.D., C.B., Inspector-General of Hospitals. Delivered at a Meeting of the Army Medical Society, Montreal, being an Appendix to his Annual Report for 1863.

The subject which I have selected for our discussion to-day is "Pneumonia," and my reasons for doing so are, 1st, it is a frequent and often fatal disease in this Command; and, 2ndly, because there seems to be a considerable diversity of opinion amongst us as to its therapeutic management. From what I have observed, some Medical Officers treat it after the old heroic plan—by copious bleeding and antiphlogistics. Others chiefly rely on the stimulating and supporting system; while some, again, avail themselves sometimes of one and sometimes another of these general methods.

If I am not mistaken, the want which is most felt by young Medical Officers is that of *some sound general principles* to guide them when they come to deal with this disease clinically, and that is what I am desirous of attempting to supply.

In the following remarks I shall first submit a few propositions, embodying certain pathological facts bearing on the management of the disease, and then, with reference to the leading indications for treatment, advert, as concisely as possible, to the practical views which appear to be most consistent with our present knowledge of the disease and the results of clinical experience.

Few diseases have been studied with more diligence and success, within the last few years, than pneumonia, whether as regards its morbid anatomy, symptomatic phenomena, or pathological character and laws; and, perhaps, in no other inflammatory affection has clinical observation been brought to bear so fully and efficiently as regards its treatment.

In the first place, abundant facts have been collected respecting its course, when uninfluenced by active medication, or, in other words, by the study of its natural history; and, in the second place, data have been afforded for judging of the relative value of different modes of management.

As a consequence, a considerable change has taken place among medical men, both in and out of the army, as to doctrine and practice. Therapeutical measures which but a few years ago were generally regarded as almost essential to its successful treatment, are now by many deemed often needless and hurtful. On the other hand, measures formerly considered as uncalled for and hazardous, are by many supposed to be highly important.

Believing that, after making due allowance for a tendency to pass to opposite extremes, which characterises the fluctuation of medical doctrines, a real and truly important progress has been made of late in practical views respecting this disease, it shall be my object to point out in what, as appears to me, this progress consists.

The first of the pathological facts referred to, which has been established by the study of the natural history of this disease is, That ordinary pneumonia, uncomplicated, and not extending over more than a single lobe, involves little or no danger to life, and is readily curable without any aid from art,—in fact, that such an amount of disease in ordinary healthy subjects, will speedily get well of itself. Further, that in similar circumstances, even a whole lung, or a portion of both lungs (double pneumonia) which has become hepatized from the exudation of coagulable lymph (*i. e.*, in the second stage of the disease), has within itself the powers of self-restoration, independently of active medication, provided life is sufficiently prolonged and sustained to admit of the natural reparative processes having full play.

The second fact or principle which has been established by observation conducted after the same fashion, is this,—that, in the great proportion of fatal cases, whether in complicated or uncomplicated pneumonia, the tendency to death is by asthenia, and not by apnœa.

The importance of these deductions, which are beyond the possibility of cavil, will be sufficiently obvious to you in a practical point of view.

Passing now to the second and most important branch of the subject, viz., the *treatment*, I need hardly remind you of the three stages into which systematic writers divide the disease, viz., the first, or congestive; the second, or that of hepatization; and the third, or that of softening (purulent inflammation); nor of the general symptoms or physical signs which characterise each. These, of course, are well known to each of you, as well as the distinction—sthenic and asthenic pneumonia (in proportion as the type of the accompanying fever is inflammatory or typhoid), of pneumonia as an intercurrent symptom in other diseases—as the essential fevers, for example, or pneumonia complicated with pericarditis, delirium tremens, and other affections.

The indications for treatment in cases of pneumonia must have regard to the stage of the disease.

First Stage.—When patients are seen in the first stage, *i. e.*, prior to the solidification of the affected lobe, important objects of treatment, if attainable, doubtless are the limitation of the inflammation, the prevention of exudation, and the restriction of the local affection to the lobe first invaded,—in other words, the arrest of the disease.

Are these objects obtainable? With our present knowledge, this question resolves itself into another, viz., will the antiphlogistic method of treatment, so-called, of which blood-letting is the most prominent measure, control the disease? Clinical experience certainly warrants the assertion that this method of treatment cannot be relied upon for effecting the objects just named. If this method even succeed in arresting pneumonia, the chance of success in any case is too small to justify its employment whenever it comes into conflict with other indications; or, in other words, whenever it will be likely to do harm when it does not succeed.

Putting aside arrest of the disease as an object of treatment in the first stage, the enquiry arises, may not active measures in this stage so influence the disease as to diminish its intensity, and thereby the danger, aiding the patient to pass through it more quickly and safely than if the measures were not employed; and will not blood-letting conduce to those desirable ends?

A candid review of the discussions which have taken place within the last few years respecting blood-letting in pneumonia, together with the results of clinical experience, can hardly fail to lead to the conviction that, *employed indiscriminately*, it will do much more harm than good.

But while this conclusion must be admitted as applicable to the general run of cases in civil hospitals, there cannot be a doubt that, in many instances, blood-letting is most beneficial, and especially in military practice. When the patient is robust or of a full habit, and the disease has not advanced to the second stage, and is characterised by a strong, full pulse, hot skin, severe pain, with more or less dyspnœa, the abstraction of blood will undoubtedly afford relief, and place the patient in a better condition as to recovery than if no such treatment had been resorted to. The good effect of this is explicable on physical if on no other grounds. The heart and lungs are embarrassed by a sudden and extraordinary flow of blood towards them, which state of congestion a smart bleeding will often mitigate or remove.

But it is to such cases, *i.e.*, *sthenic* pneumonia in its formative stage, that phlebotomy should be restricted, and even then it should be practised with circumspection, always recollecting that it is spoliative in its effects, and that it is necessary to husband the powers of the system for the reparative processes which it will be called upon to put forth at a later period.

And often an adequate substitute will be found in saline purgatives and nauseant and arterial sedatives, of which antimony forms the base, supplemented, when needs be, by leeching or cupping.

These salines deplete without the loss of blood-corpuscles, diminishing the frequency and force of the heart's action. But as in general blood-letting, so in the use of these anti-febrile remedies, discrimination must be exercised, and they ought never to be carried to the extent of producing marked or continued depressing effects, and omitted whenever the action of the heart, as represented by the strength of the pulse, denotes a tendency to failure of the powers of life, as if persisted in, in such circumstances, they will contribute to the danger of death by asthenia.

The rule, then, to guide us in the employment of blood-letting and antimonials in this stage of the disease is not, as appears to me, the extent of the local affection so much as the *degree of the symptomatic febrile movement*, inasmuch as they can only influence the local lesion indirectly in so far as the latter is intensified by the former, and they are contra-indicated, whenever from previous health, constitution, or other circumstances, danger is to be anticipated from the failure of the vital powers.

The acute pleuritic pain so common in this stage will often be relieved by local measures, such as dry cupping, stuping with hot water or turpentine, enveloping the affected side in a large poultice, oiled muslin jacket, &c. As pain causes restraint of the respiratory movements, and thereby increases dyspnœa, it is often surprising how much the latter is relieved by the mitigation or removal of the former.

Before passing from the first stage of the disease to those that follow, let me remind you that it is in it almost exclusively that active treatment, so-called, is practicable. And when it is recollected that in general its duration does not exceed forty-eight hours, and often not more than twelve or twenty-four, it will be seen how short is the period at our command in which it can be practised.

Second Stage.—The indications which have reference to the second stage of pneumonia are now to be considered.

This is the stage, as you are aware, in which our patients generally reclaim our aid, and as I have just stated often speedily follows the attack. The physical sign of solidification (bronchial respiration and bronchophony) afford reliable information on this point.

The absence of chlorides in the urine also may be relied on with pretty implicit confidence that the process of exudation is going on.

In this stage, so far as the local affection of the lobe primarily involved is concerned, all the mischief, which in the majority of cases may be expected to occur, has already taken place.

The only untoward events, exclusive of complications, which are to be apprehended, are the invasion of other lobes, and possibly suppuration and gangrene; the probability of an invasion of another lobe cannot be determined, and if this were possible, the prevention does not lie within the scope of our resources. What then are the objects of management in this stage?

It may be laid down as a rule that blood-letting in this stage is not only not indicated but is positively injurious. If high febrile movement exists, the nauseant and arterial sedatives are indicated; but they are to be employed with even greater circumspection than in the 1st stage, and they are not to be given for other objects than those already stated. It may be assumed that in a large proportion of cases, they are either uncalled for or contra-indicated in this stage.

What then are the requirements for recovery?

1st. The exudation is to be removed, and 2nd, the powers of life must be adequate to carry the patient through the process of restoration.

The question then comes up, what is to be done to promote resolution of the local lesion, and what to aid the powers of life to effect recovery?

With regard to the resolution of the local affection, many Medical Officers, I observe, trust to calomel and opium, pushing the mercury to ptyalism. Now, I wish to point out to such that there is no fact now better established by the clinical observation of modern pathologists, than that absorption of the exuded matter will go on as well without as with mercurialization. This has been most satisfactorily proved by experiments made in cases of iritis, which of all other instances was the one triumphantly cited in which the absorbent power of mercury may be most positively demonstrated.

It is now found that if the affected eye be put in the condition necessary to its recovery, the exuded lymph will disappear as quickly without, as when ptyalism is excited. In India, I may mention, that in enlarged liver following hepatitis, the use of mercury as a deobstruent is now abandoned by the most enlightened practical physicians, my friend Morehead amongst the number.

And if inoperative for good, so potent a remedy as mercury is not devoid of harm. Its effects are depressing and deteriorating; in calling them into play, we are virtually adding a second evil to the one already existing.

The sooner then we discard the routine system of prescribing calomel and opium in cases of consolidated organs, under the erroneous idea of its absorbent powers, the better. I am convinced from long and careful observation that the practice is fraught with mischief, and wholly ineffective for the object in view; an opinion which is now endorsed by some of the most enlightened British and foreign physicians.

With regard to *antimonial* preparations as resolvants, modern clinical observation has evolved a similar conclusion. Since the natural history of this disease has been studied, and the fact ascertained, that solidification may disappear rapidly, without medication of any kind, it has come to be understood how these and other remedies were once vaunted for their resolving qualities. In fact they got the credit for what was due to other, or natural causes.

Again, blisters have been considered useful in hastening resolution. There is no evidence that they contribute to this object, and they are highly objectionable on account of the annoyance and irritation which they occasion, besides interfering with the daily examination of the chest.

With regard to *expectorants*, I am sure that your pathological views of this disease are too enlightened to admit of your believing that exudation can be removed by any remedies of this class. They can only be useful when bronchitis is superadded, as it often is in those cases which are tending to a fatal issue, when accumulation in the bronchial tubes is so apt to occur.

With respect to *purgatives* it may be stated that in this stage they are worse than useless as a plan of treatment, although an occasional laxative may be required when inconvenience occurs from accumulation in the bowels.

In a word it may be assumed as an established fact that in the present state of our knowledge, we are unable to expedite resolution by any measures employed directly and specially for this object; and that measures having reference to the general condition of the patient are, if not the only, the most efficient means of acting on the local affection.

This brings us to the consideration of our second question, viz. How are we to aid the power of life to effect recovery?

We may lay it down as an axiom that pure pneumonia is as much a self-limited affection as the essential fevers. Divested of complications and accidents, it runs a definite career, and ends in restoration, if life be sufficiently prolonged. The exceptions to this statement are the rare instances in which the disease runs into the third or purulent stage.

To support the powers of life is, therefore, the leading general indication in the second stage of pneumonia. This in urgency varies much in different cases. In general terms it is urgent in proportion to the danger from asthenia.

It is a serious mistake to defer supporting measures until the symptoms denote imminent danger from failure of the powers of life. If deferred until then, they will probably be too late. We should foresee and endeavour to forestall a degree of failure attended with danger. The constitution of the patient, his previous health and habits, are to be taken into consideration in judging early of the ability to sustain the disease.

In the variety especially distinguished as asthenic and typhoid, the reliance for successful management must be on supporting measures. Until lately the minds of medical men have been so much occupied with the means of subduing inflammation as to overlook the fact that the means to this end not only often conflicts with those which are more important for recovery, but may be positively injurious, and even destructive of life.

Heretofore, attention has been directed too much to the disease, and too little to the patient. We have seen that our chances of subduing the disease are small. We can only hope in the first stage to moderate its intensity; in the second and succeeding stages our chief reliance must be placed in carrying the patient safely through them by sustaining the powers of life.

How is this to be effected? We reply, by tonic remedies, alcoholic stimulants, nutritious diet, and all these hygienic precautions which is comprised in the category of what is now called conservative medicine.

Of tonics quinine is the best, and is doubly called for in cases where a malarious taint is suspected; and exhibited in the pneumonia of ague in every stage of the intermittent.

Alcoholic stimulants form a very important part of the supporting system in this disease, as in all others, whenever the great object *is* to keep the patient alive until the disease has reached the end of its career, as is exemplified in the essential fevers.

In pneumonia as in typhus there is often a remarkable tolerance of alcohol. No abstract rules can be laid down for the proper quantity in any given case, nor proper time to commence stimulants; but, as a general rule, they are indicated, and should be commenced as soon as evidence appears of any tendency to failure in the powers of life—of which the pulse is the best criterion. It is safer to begin too early than too late; with proper care they can be suspended and resumed, but the time lost by beginning too late cannot be regained.

But stimulants, it must never be forgotten, are potent for evil as well as for good, and it must not be supposed that in this stage they are invariably indicated, or never do harm.

On the contrary, if commenced too early, or pushed to an injurious extreme, they are pregnant with mischief; in exhibiting them it is necessary continually to feel one's way, and to be guided by the result. It is to be feared that the doctrines of Dr. Todd with regard to alcohol, and which he undoubtedly carried too far, are too servilely followed by many of his school, to the neglect of alimentation, and other sustaining measures.

Alimentation is an essential part of the supporting treatment. It is as necessary to feed pneumonia as to feed fevers, when there is danger from failure of the vital powers.

Animal essences, soups, milk, and farinaceous food should combine to form the diet, and may be allowed during the whole of the second and subsequent stages, and in some rare exceptional cases, even from the first attack.

Of *hygienic* measures, of which pure cool air is the chief, it is not necessary to speak, as these will be sufficiently appreciated, I feel persuaded, by you all.

Under the head of supporting the system, there is one remedy to which I would desire to call your special attention, because I do not believe it has received that consideration which it deserves. I allude to the exhibition of *opium* in *full* doses. What is the *rationale* of its action it is difficult to say, whether by its tranquilizing and soothing effects, or in some more specific way, is uncertain but; in this, as, indeed, in almost all cases in which the constitution is called upon to battle against the inroads of grave disease, it is an invaluable remedy. It seems to render the system more tolerant of the local injury, and is most serviceable when there is unusual disturbance manifested by restlessness, vigilance, delirium, irritability of pulse, &c.

In peritonitis we know how many lives have been saved since its exhibition in large doses supplanted the old depleting plan of treatment, although we are in ignorance as to how it acts.

With regard to the third stage it is not necessary to say more than that all the measures already set forth as indicated in the second are doubly necessary in the third stage, and must be pushed more vigorously, inasmuch as the danger is greater and the hope of a successful issue more precarious.

One remark only would I make, viz., that timely and efficient support probably affords the best security against suppuration.

One word with regard to the management of *convalescence*.

There is little or no tendency in this disease to relapse or to become chronic, and therefore the restrictions respecting food and early sitting up are not so imperative as in many other diseases, such as the essential fevers. In fact less restriction in diet than is generally supposed safe will expedite convalescence and cause a more perfect and speedy recovery.

Such then is a sketch, and a very imperfect one, of what appears to me to be the soundest view and most rational and successful mode of treatment of pneumonia. You will observe that I am a convert to the doctrines of the new school, which condemns the profuse and indiscriminate practice of blood-letting so long in vogue in the treatment of this disease, or at least restricts it to its first stage, and then under certain conditions which have been specified. There cannot be a doubt that this revolution in opinion and practice has done, and is doing, much good.

From an analysis of the cases in Andral's Clinique Médicale, by Dr. Markham (that celebrated physician's practice being to bleed largely in all stages, irrespective of age, condition, &c.) it appears that in uncomplicated cases, one-half died, and in complicated two-thirds died. From the statistics recently laid before the profession by Dr. Hughes Bennett, drawn from cases in the Edinburgh Infirmary, and treated on the new system, the mortality is shown to be at the rate of 1 in 35 cases. In the same Institution it was 1 in 3 during the years 1832-1849 under the old.

This comparison (which has not been made by selecting cases or any other unfair means) is certainly very striking, and is not to be explained on the supposition of a change of type, constitution, or any other of the reasons so often set up to account for the great change that has come over the character of disease (fevers especially) of late years; but seems entirely due to the more rational or conservative system which has recently come in vogue.

In gun shot wounds of the lungs, you will recollect Guthrie reccommends bleeding *ad deliquium* often repeated; in the practice of the American army it is entirely abandoned in such circumstances.

I cannot press this subject too earnestly on the adoption of junior Medical Officers. Let them abandon all routine practice, and have a reason for everything they do. When called to treat a case of disease (as a general rule) let them recollect that it is through the powers of the patient's constitution that a cure can be brought about, and not by the fancied virtues of this or that article of the pharmacopœia, and that these powers must be carefully weighed and husbanded. Let them bear in mind that the natural tendency of all diseased action is to recovery, if life be sufficiently prolonged, and that half the fatal cases which occur are due to our doing too much (*nimia cura medici*) to our knocking nature down, as it were, when she is struggling to recover herself instead of aiding and sustaining her in her restorative efforts—*ancilla naturæ non magister, medicus est.*

Above all things let them realize the fact that *inflammation*, such a *bête noire* to many, is itself a restorative process, being no less than the means which nature herself sets up to rid her of some offending cause, or apprehended mischief. Long before palpable evidence of inflammation exists, a change has taken place in the blood, of what nature, and how brought about, we know not, but to counteract which this process is called into play. It is a conservative process, and not to be rudely or recklessly interfered with.

These doctrines may be new to some of you, but I believe them to be sound, and they are in my opinion calculated, when legitimately applied and rationally interpreted, yet to work great good to suffering humanity.

It is the true line of progress along which we must march, if we would advance instead of standing still; and in which our steps will be most sure until medicine becomes more entitled to the name of a *science* than she is at present.

OBSERVATIONS ON HEPATIC DISEASE.

By Staff Surgeon-Major H. H. Massy, M.D., Army Medical Department, late of the 2nd Dragoon Guards. (Communicated in 1862.)

The following remarks regarding certain questions in diseased states of the liver are referable to these conditions as met in India, and in some respects more especially to the station of Lucknow, where, unquestionably, there was at the period referred to, from 1859 to 1861 inclusive, less frequent association in the same individual of hepatitis and dysentery than is often encountered in other parts of India. During this period these diseases were not very prevalent at the above-named station, but they were sufficiently so to afford a considerable experience.

It is not intended here to trespass upon the wide field of hepatic disease beyond a few enquiries connected with hepatitis and hepatic abscess, and some concluding remarks upon the treatment of the former in its acute stage.

The distinctive characters of diseases of the liver are laid down with great precision in books, and doubtless such a course is right as determining the classification of diseased states, and it receives much corroboration from pathological investigation; but such characters are not always practically found readily discoverable in the living sufferer. The anatomy and structure of the liver have been so plainly demonstrated in recent years, that we are enabled to trace morbid alterations as described, and to follow their consecutive engagements in numerous instances; but still many questions are by no means clear, and some are supported by conclusions which do not always receive from pathological enquiry the proof assumed. Moreover the views of Dr. Beale, more especially those upon the nature of the areolar tissue, indicate that the structure of the liver cannot yet be concluded as determined beyond further research.

Some years residence in India, as surgeon of an European regiment, has led me to believe, that not only is a proclivity manifest in this country to generation of abnormal states of the liver, but that deranged conditions of that organ which in temperate climates assume, and for the most part continue to present distinctive characters, are prone not only to quicker development, but frequently tend to hepatic inflammation, either in chronic or acute forms. The pursuit of this subject, however, would involve a more extended discussion than can be introduced into these remarks, where it can be little more than alluded to.

The distinctions between active and passive vascular congestion of the liver are not always so evident as one is led to expect. In India the liver is so prone to abnormal states as primary affections, that passive congestion, associated with and dependent upon organic disease of the heart, occasioning impediment to the flow of blood through the liver, chiefly influencing the hepatic veins, is comparatively seldom encountered; it is gradual in its progress, and is, generally speaking, easily diagnosed. The association of symptoms of congestion of the liver and organic cardiac disease would direct attention to their probable consecutive dependence.

The symptoms usually characterized as resultant from congestion of the liver most generally in India point to very different causes; but a difficulty is often presented of determining whether this is a condition engaging alone the portal circulation, or including the hepatic arterial capillaries. The connection between the capillaries of the hepatic artery and portal vein provides an anatomical distribution which favours the extension from the latter to the former; and whether it is a slow or more speedy process, acting by direct impediment to the circulation, or especially by disturbing the function of the liver, induced by heat, determinations from the skin or otherwise, the liability of the extension of the lesion to the nutritive portion of the circulation exists. Nevertheless it is true that a sense of weight in the right hypochondrium, with the usual signs and symptoms of passive congestion of the liver, apart from malarious fever, constantly continue for a length of time, and do not become developed into symptoms of inflammation of the viscus. Still more great enlargement of the organ may pertain, and such changes take place in its structure as to greatly impede its functions. These are often the results of congestion in malarious fevers, yet on curing the fever, the great enlargement of the liver and the associated degenerations of structure commonly disappear. This is the daily experience of Medical Officers in India, but the state of system produced by malaria with which these changes occur, must be presumed to modify the character of the congestion.

Diarrhœa and dysentery are often associated with the ordinary symptoms of what is understood as passive congestion of the liver, and it happens occasionally that the hepatic derangement is overlooked until serious organic lesion, even the formation of abscess, is established. Few diseases, functional or organic, more exemplify errors in practice than overlooking the connection in these cases. In chronic forms of hepatitis it not unfrequently happens that the invasion and advance of structural lesion is so insidious that it is difficult to diagnose whether the symptoms pertain to passive or active congestion. I have seen the formation of abscess preceded by symptoms which could not have enabled an accurate opinion to be formed at an early period. In these insidious cases fever is not always readily detectable until considerable progress has been made by the disease. I have known a troop sergeant-major perform his duties as a dragoon for some time when, unquestionably, a large abscess existed in his liver.

Associated with the foregoing the ordinary causes of abscess of the liver are open to investigation; without following the subject to the consideration of the various causes assigned, those that are generally assumed as the most usual sources are pyœmia, and inflammation produced in some tissue of the gland from other causes. Defining this still more I shall confine my few remarks to abscess resulting from metastatic disease, as it is sometimes designated, from dysentery, and inflammation of the liver as ordinarily met in hot climates unconnected with this cause, and engaging the parenchyma primarily or secondarily, as regards the capsule. These questions, at first sight, do not appear to have received the elucidation that would seem possible, especially in India; but no doubt there is great difficulty in the investigation of the subject, or it would ere this have been explored. The origin of suppuration in the liver as depending on metastatic disease in connection with dysentery is by no means regarded as a secondary disease arising in a debilitated condition of health, where the deterioration of constitution affords a predisposition to the invasion of secondary disease. Pyœmia, or some analogous contamination of the blood, is the proximate cause assigned. The influence of this source of hepatic abscess has afforded considerable discussion, and though it is generally admitted, has not escaped much question. The theory of the formation of abscess of the liver in this way is very probable, and resembles in many respects the formation of pus in other organs and structures from a pyœmic source, and has obtained collateral support which tends much to its verification. Yet it must be admitted that but little light has been thrown on the production of abscess of the liver in this way from pathological enquiry, and it is to be hoped that Medical Officers in India, to whom we owe so much, will continue to direct attention to this subject, interesting as a pathological enquiry, and one of considerable practical importance.

There is no doubt the very frequent association of dysentery with hepatic abscess in India tends to give a great prominence to the view of the dependence of the latter upon the former; but it appears to me this association of disease is not always closely investigated, and tends to the idea of a much more extensive origin of hepatic abscess from a pyœmic source than would seem to be due to it. Many considerations have led me to believe that a much larger proportion of cases have an origin from climatic causes independent of dysentery, or not fairly assignable to a pyœmic source from that disease.

The views of Virchow on several of the theories advanced by pathologists, as tending to elucidate the probable steps in the progress of pyœmia, though in many respects so true and subversive of some doctrines, do not altogether supply the void which exists in so many particulars of that protean condition.

The absorption of pus corpuscules from the intestine in dysentery, either by lacteals or lymphatics, and their conveyance to and arrest in the liver, producing suppuration in this organ, seems out of the question. Were disintegration of the pus corpuscules to take place, and even only their fluid portion to be absorbed, granting it underwent no change in the lymphatic glands it must necessarily pass through, still it would be borne into the general circulation, and assuming it to create suppurative inflammation, would be as likely to generate this action in some other organ or structure as in the liver. As pus cannot enter a vein the continuity of which is intact, it could only in its entirety obtain admission into a vein where destruction of a portion of the wall existed, in which case the hœmorrhage that would be likely to ensue would most probably eject it. The generation of pus by phlebitis, and its circulation in the blood, no longer obtains presumed substantiation; the similarity recognised in nuclei, and, in fact in all respects, between colourless blood cells and pus corpuscules has tended to elucidate the confusion that here existed. The more probable connection is presented of the absorption, or the admission by endosmose or otherwise into the porta or its tributaries of the fluid portion of pus, or of some thin putrid fluid or gases, the result of a septic alteration produced by dysentery. Or embolism may be presumed a source, the clot originating possibly from phlebitis connected with the diseased state of the mucous membrane of the intestine.

If pyœmia originating from dysentery is admitted as a cause of abscess of the liver, conceding the great eliminating power of this viscus, numerous examples point to the fact of substances being partially separated, and partially passing on through its circulation; and it seems strange that putrid fluid, gases, or the debris of embolic particles in the portal circulation, should not pass beyond the liver, it would seem reasonable to suppose that occasionally some of these matters would reach the lungs, and there occasion abscess; but I believe distinctly separate abscesses co-existing in the liver and lungs, combined with dysentery, are very rare. This would seem more remarkable from the greater size of the capillaries of the liver than those of the lungs, affording a possibility for matters to pass through those of the liver which might be arrested in the lungs.

It might be interesting, were statistics available, to institute some enquiry as to the proportion in which metastatic deposits follow certain morbid changes in organs, areolar tissue, or other structures. Any morbid principles produced during the process of the destruction or degeneration of tissue, entering the vena porta would most probably reach the liver, and there, if not eliminated, and sufficiently deleterious, develop abscess; but all such elements entering the organism directly through the veins, except through the porta or its tributary veins, must stand in somewhat the same relation to the lungs; yet how infrequently in proportion to the existence of diseased states does the surgeon or physician meet the productions of metastatic deposits, engendering secondary abscess, from primary abscess or ulceration. The foregoing observations do not fully apply to the conditions presented by amputations and other large surgical operations, where divided veins lie unligatured in suppurating tissues in soft parts, and patulous in bone, nor to those cases where the general system becomes contaminated in such an inexplicable way through some constitutional change.

In pursuing somewhat more practical features, after a brief consideration of some few questions, I shall introduce short abstracts of eleven cases of abscess of the liver, ten fatal, in none of which, in my opinion, were there any grounds for inferring a pyœmic source. The prevalence of dysentery amongst European children in India is very great, and the consequent mortality considerable; but acute hepatitis in childhood is relatively uncommon, and death from hepatic abscess at this time of life may be said to be comparatively seldom met with. It seems almost unaccountable that ulceration of the bowels in phthisical patients, or in enteric fever, should not be productive of hepatic abscess.

Dr. Lyons, while in the Crimea, had probably as extensive a field for pathological research in acute dysentery as often falls to the lot of practising physicians. He examined a great number of cases, and details the post-mortem appearances minutely in fifty instances of death from dysentery, and in only one was abscess of the liver found. The force of these investigations is augmented from the fact that dysentery was very common in the Crimea, and hepatitis, in comparison, very rare; whereas both diseases in India, the latter frequently passing into suppuration, are exceedingly prevalent. During 1859, 1860, and 1861, the period the 2nd Dragoon Guards were quartered at Lucknow, hepatic affections occurring to men in the regiment were seldom accompanied by dysentery; and in proof of the usually uncomplicated nature of cases admitted under the head of dysentery, 270 cases of this disease were treated in the regimental hospital in the three years; of these five died, and one was invalided; two of the five died from heat apoplexy, when patients in hospital for dysentery. In none of the five was disease of the liver found after death. All the others returned to their duty cured. In a few of them hepatitis was associated with dysentery; but in none was persistent hepatic disease established. It may be asked how, considering the concurrent testimony of numerous experienced investigators with reference to the association of hepatic disease and dysentery in India, my experience at this period had been somewhat different. I can only reply as to the accuracy of my statements, that they are made from the regimental returns, and in pursuing the exposition shall afford reasons that, in my opinion, may have been conducive in occasioning this result. It may be as well here to observe, that it is stated—"Abscess of the liver seems to occur chiefly in conjunction with the sloughing ulceration in acute dysentery; and with chronic ulcers attended with thickening and induration of the submucous areolar tissue."* In both these conditions my experience during the period under review has been limited. Among all the cases treated by me during the three years, not more than five or six exhibited symptoms of sloughing, and chronic dysentery has been latterly almost unknown to me. It may be presumed that soldiers are enlisted from pretty much the same class of the population as heretofore; but it is possible that at the time referred to, from greater care in removing temptation, the men drank less, and from other prophylactic measures in military hygiene, they may have been less submitted to malaria, sun, and other influences predisposing to serious disease, than at other periods. Possibly climatic changes, totally unaccountable, may alter the types of disease in localities in a short cycle of years, as seen often in Europe, even originating new diseases; or probably these were exceptional seasons. A reason that appears to me to have been influential in determining the infrequency of secondary disease associated with acute dysentery amongst the men of the 2nd Dragoon Guards, is the favourable result of the treatment of the latter affection by large doses of ipecacuanha. It usually cures in a few days, avoiding injury to the constitution by prolonged disease, affording no time for the development of extensive or secondary affections.

Investigation of these various questions in the etiology and pathology of these diseases must always afford information of great interest, and nowhere can such investigations be more accurately pursued than in India. But at the threshold of this enquiry caution is needed. It seems hardly admissible that in the case of a man who has been the subject of even severe dysentery, and who, within a short period of his recovery, is seized with hepatitis, and dies of abscess of the liver, the dysentery has been the immediate cause of the abscess. Some period must mark the connective limit. It is stated that "when the inflammation is consequent on a wound or injury, and also in all probability, when it occurs in the course of dysentery, it passes on to suppuration in the course of two or three days."* If this is the case it would, in numerous instances, render the question much less difficult, as in the case of a soldier who, during the rains towards the close of the hot season in the plains, suffered more or less severely from dysentery, and was discharged from hospital after a time apparently cured. He performs his duties and regains his appearance of health; but early in the cold season is suddenly attacked with hepatitis, which ends in abscess. It is scarcely impartial to assume a connection here, yet some Medical Officers argue in this way, and adopt special pleading to prove a connection in such instances. There are objections on the ground of possible erroneous treatment, if such conclusions are extensively admitted. If an abscess is expected because hepatitis succeeds an attack of dysentery, active treatment might not be satisfactorily pursued, and valuable time lost when alone treatment could succeed.

During the treatment of hepatitis an abscess is believed to have formed in the liver; in many cases, however, this, to a certain period, must be somewhat conjectural. An affection of the bowels terminating in dysentery may subsequently arise not uncommonly from deficiency or vitiation of bile, or from derangement of the portal circulation. After death an abscess is found in the liver, and ulceration of some portion of the colon: yet, prior to the period referred to, the patient may never have suffered from bowel complaint. Those cases in which there is an absence of positive evidence of abscess prior to the occurrence of the dysentery may be assumed instances of a pyœmic source; but that they are invariably so would appear to me far from conclusive. Abscess frequently forming in the absence of dysentery altogether, and its often unequivocally occurring prior to the appearance of the latter, weaken arguments in favour of a pyœmic connection. Dr. Morehead affords the weight of his valuable opinion very decisively on this point, and further regards the coexistence of primary hepatitis passing on to abscess and secondary dysentery as illustrative of a general law by which the hectic stage of extensive suppuration is often associated with intestinal ulceration. The following case exemplifies this.

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* "Diseases of the Liver." By George Budd, M.D.

I. *Brief Abstract of Case.*

P. F., 2nd Dragoon Guards, aged 24, admitted 27th October, 1859. Disease, hepatitis acuta. Died January 31st, 1860. Had been admitted into hospital for a very slight attack of dysenteria acuta on the 28th September, 1859, and discharged the 4th October following, was free from all symptoms of dysentery on the 30th September. Never had dysentery again until a short time before he died, and subsequent to unequivocal evidences of abscess of the liver. The post mortem examination revealed a large abscess of right lobe, no opening, some recent ulceration of colon.

When hepatitis resulting in abscess and dysentery are coeval, or nearly so, the exclusive dependence of the abscess upon a pyœmic origin from the latter would seem by no means determinate. Men die of hepatic abscess unassociated with dysentery; they also die of all forms of dysentery in the absence of hepatic disease. And where hepatitis ending in abscess and dysentery coexist, it appears reasonable to suppose that a greater degree of hepatic disease may run into abscess without the necessity of pyœmia or any analogous contamination of the blood. Hepatitis and dysentery in India are recognized as liable to be produced from very similar causes, and both diseases may often coexist in a very serious degree and the patient recover. At the same time it not infrequently occurs that when hepatic disease and dysentery are coeval, death very speedily results, and abscess of the liver and ulceration of the bowels are discovered on post mortem examination. The dysenteric symptoms may be severe and the hepatic symptoms often very slight, yet abscess quickly forms. Such cases are often very remarkable, and if pathology can be expected to throw positive light upon the connexion of these diseases, they would seem highly favourable for investigation.

The great investigators of the diseases of India of a few years back, as well as many recent authorities, whose experience has been derived from extensive practice in India, attribute hepatitis and consecutive abscess in this country chiefly to the great heat and vicissitudes of the climate. The European at home under ordinary circumstances eliminates the effete principles from waste of tissue, &c., in a due proportionable degree through the lungs, liver, kidneys, and skin. The variations in proportional elimination occasion often derangements and diseases, but as the initiating causes are much less in degree, such diseases don't so usually assume the formidable characters they obtain daily in India. Here in the hot weather, the liver and skin eliminate much of the effete matters from the system. The rare condition of the atmosphere, and the diminished necessity for supporting animal heat, where the temperature of the air exceeds that of animals in health, renders the lungs much less influential in this respect than in colder climates. The secretion from the skin by sensible and insensible perspiration is very great, it is not easy to determine its amount; Seguin showed it to be about 33 ounces in 24 hours. In India it would doubtless exceed this in the hot weather The composition of cutaneous excreted organic matter is not very accurately determined; no doubt between the sebaceous and watery excretion much organic matter is eliminated. The skin, moreover, in a hot climate, is most powerful in cooling the system, from the evaporation of its secretion, during which much heat is evolved from the body. It regulates, in a great measure, the temperature of the system, the amount of secretion being for the most part dependent upon the temperature of the air. This is another function of the highest importance in tropical climates less exercised in colder latitudes. The cutaneous capillary circulation is so much increased during the hot season in India that its effects in the form of prickly heat, boils, and irritation of the skin, more especially when evaporation is somewhat checked in the rains, are some of the most tormenting minor annoyances to which the European is liable. It is not here intended to consider the chemical analysis of the secretion of the liver, or minutely the part it plays in the animal economy. It is difficult to determine the amount of bile formed, but the quantity of non-nitrogenous matter separated from the system by the liver is very great. Whether its function is chiefly excrementitious, or more important in digestion, or adjunctive to respiration, it is unquestionably very important to the maintenance of health, and even more, so it would appear, in a tropical than in a temperate climate.

Derangement of the function of either the liver or skin reacts upon the other, as witnessed every day in India, from the effects of chills and from heat. Whether much more nitrogenous matter is eliminated through the liver when the secretion of the skin is interfered with is a very important question, but no doubt much more work is thrown upon it under such circumstances, and hence the effect of vicissitudes of temperature. The early part of the cold season is the special period of hepatic disease; reaction by diminished heat-producing powers is slower and more imperfect than in Europe. For seven hot months by night and day the skin has been throwing off enormous quantities of fluid, so exhausting is the process that it blanches the European, and gives him an anœmic appearance, which seems to be allied in a minor degree to that condition of quantitive deficiency of blood cells, with probable alteration of the fluid portion, described as pertaining in anœmia, but which is quite consonant in this minor degree with health in a hot climate; differing widely from those in whom the quality of the blood is deranged from the proportional relation obtaining in the healthy state, between the red and white corpuscules, in which an undue proportion of the latter prevails, a condition by no means associated with health. The system in its way is partially accustomed to this extensive drain, when suddenly in the rains, or at the advent of the cold weather, it is checked, and the liver is called upon to act to an inordinate extent; derangement of function, congestion or inflammation often result. The heat of the climate, also, is highly influential *per se* in causing derangement and disease. Increased secretion at one time, torpor at another, and sudden irregularities frequently prevail; these are indications of conditions, which by their frequency, severity, or persistence, occasion disease, which in one man induces a limited amount of organic change, in another more extensive, even ending in abscess of the liver. Submission to a long hot season, or a series of them, the inactive life, indulgence in more food and spirits than is prudent, all tend to the production of these morbid states. Though it is quite true temperate habits afford little exemption from hepatitis and abscess of the liver; moreover on referring to the recorded opinions of medical gentlemen who have served in India, I find some of them ignore and others make no direct affirmative statements as to the influence of intemperate habits as tending to excite other diseases of the liver than cirrhosis or albuminoid and fatty deposits. Still the treatment of European soldiers in India has induced me to hold a somewhat different opinion on this head, and to believe that a connexion often does exist between such habits, and the development of inflammation and suppuration in the liver. In some of the cases here introduced, cirrhosis and hepatic abscess coexisted, and where soldiers are the subjects of chronic derangements of the liver, drunken debauches are very liable to arouse acute or sub-acute disease that ends in abscess in this organ.

II. *Brief Abstract of Case.*

Charles Barker, 2nd Dragoon Guards, aged 34. Disease hepatitis chronica. Admitted March 16th, 1860, died 28th April, 1860. He had been a very hard drinker for years, had been in hospital for acute dysentery from the 11th to the 18th October, 1859, a very slight case and discharged perfectly cured; no dysentery after the 14th. For some little time prior to admission he had been under treatment for pulmonic and hepatic diseases. After death a large abscess was found in the right lobe of liver, no opening, some very superficial ulceration in Peyer's patches in ilium, but no ulcers in colon, tubercles in upper lobes of both lungs.

III. *Brief Abstract of Case.*

John McKinnon, 2nd Dragoon Guards, aged 42. Disease hepatitis acuta. Admitted 27th August, died 14th September, 1860. A large powerful man, a very hard drinker; had been in hospital for delirium tremens during the year, never had bowel complaint; a very acute case. The post mortem examination revealed an enormous abscess in right lobe of liver, no opening, no ulceration, of colon.

IV. *Brief Abstract of Case.*

Lewis Jefferies, 2nd Dragoon Guards, aged 37. Disease, hepatitis acuta. Admitted September 17th, 1860, died 4th November, 1860. A very hard drinker; had been in the hospital during the year for delirium tremens. On post mortem examination a large abscess was found in right lobe of liver, no opening, evidences of cirrhosis, never had dysentery, no ulceration of colon.

V. *Brief Abstract of Case.*

James Farrell, 2nd Dragoon Guards, aged 33. Disease, hepatitis acuta. Admitted July 5th, 1859, died, 14th September, 1859. Had been addicted to drinking very largely of spirits for years. Post mortem appearances: a large abscess engaged nearly the entire of right lobe of liver; no opening, some granular condition of left lobe, never suffered from bowel complaint; no ulceration of bowels.

VI. *Brief Abstract of Case.*

Charles Milner, 2nd Dragoon Guards, aged 29. Disease, hepatitis chronica. Admitted 28th March, 1861, died 24th April, 1861. This man had been treated in the Artillery hospital, in Lucknow, for hepatitis acuta for some weeks previous to his admission into the regimental hospital on the 28th March, at which date an abscess of liver was quite apparent. An opening was made into it on the 15th April. On post mortem examination a large abscess was found in right lobe and a small one forming in the left. Never had bowel complaint, no ulceration of intestines. This man had been a very hard drinker for years.

These afford a proportion of five occurring in hard drinkers, out of ten fatal cases treated in the regimental hospital. Four of them were large and powerful men, rarely in hospital, and not more exposed than the other men of the regiment to the influences of climate. It would seem that spirit borne by the portal veins into the liver, whether there in part separated with the bile or carried on in circulation, is very irritating to this organ. Even in Europe this is extensively evidenced; but whether it is not to the same extent eliminated by the lungs in a hot climate, and rare condition of the atmosphere, and consequently more extensively detained, or whether the peculiar tendency to hepatic disease in India renders its irritating qualities more liable to generate active congestion and inflammation, is difficult to conclude. Possibly both reasons may be influential. Many hard drinkers in India do not suffer either from organic or functional disease of the liver. Many suffer from cirrhosis, fatty or albuminoid hepatic disease. And others become the subjects of hepatitis and abscess, and the latter condition not being found associated with persistent indulgence in the inordinate use of spirits in temperate climates, is reconcileable with the fact of the rarity of hepatic abscess originating in such climates. It is not difficult to understand why when inflammation is excited in this viscus, abscess should be so liable to form in men addicted to drink. Even the most robust looking of such subjects bear depletion badly. Antiphlogistic means when actively pursued instead of arresting the disease often tend to lower the powers of life so as to place the individual in the condition favourable to the formation of pus.

VII. *Brief Abstract of Cases.*

Edward Smith, 2nd Dragoon Guards, aged 30. Disease hepatitis chronica. Admitted 12th June, 1858. Hepatic symptoms came on very gradually; had been suffering from slight pain in the right hypochondrium for some time prior to admission, accompanied by debility and loss of appetite. Abscess of left lobe diagnosed. It was opened with a lancet, and a considerable quantity of pus discharged; he was transferred to the general hospital on the 26th July, 1858. He died in August. On post mortem examination an abscess was found in left lobe of liver, he never had bowel complaint; no diseased condition of other viscus or tissues discovered.

VIII. *Brief Abstract of Case.*

James Blewden, 2nd Dragoon Guards, aged 35. Disease hepatitis chronica. Admitted 18th January, 1860, died 27th April, 1860. This man had been in hospital in August 1859 with slight diarrhœa; the hepatic symptoms came on very gradually, similar in many respects to the previous case. Post mortem examination revealed a large abscess of right lobe of liver; no intestinal ulceration.

The two foregoing cases are instances of a very formidable form of this disease. No active symptoms from the commencement. The insidious progress often masks its nature until too late to interpose treatment with any hope of success.

IX. *Brief Abstract of Case.*

Thomas Moore, 2nd Dragoon Guards, aged 26. Disease hepatitis acuta. Admitted October 11th, 1858, died October 25th, 1858. This was a very acute and rapid case; the man had been quite well up to a day or two prior to admission. On post mortem examination a large abscess was found in right lobe of liver. Never had bowel complaint. No ulceration of colon.

X. *Brief Abstract of Case.*

James Wood, 2nd Dragoon Guards, aged 23. Disease, hepatitis acuta. Admitted 31st October, died 3rd September, 1860. Never had bowel complaint until a few days before his death. Post mortem examination revealed a large abscess in right lobe of liver. It had burst into the stomach and peritoneum. One or two small patches of a dark red colour about to ulcerate below the sigmoid flexure of colon and some vascularity lower down were observed.

XI. *Brief Abstract of Case.*

Alexander Moody, 35th Regiment, aged 28. In India six years. In January 1860, admitted into hospital, at Meerut for hepatitis acuta; never had dysentery, never in hospital before. Was salivated, leeched, and blistered. Was sent to the Sanatarium at Landour, where an abscess of liver was opened by Surgeon L. Stewart in July. Was quite well in October 1860*

The effect of climate is likewise very decisive in producing abscess of the liver in some of the inferior animals in this country. On returning to the plains in 1860, from the Sanatarium of Landour, I stopped a few hours at the foot of the hills at Rajhpore, and inspected the famous pig breeding establishment belonging to Mr. Hesseltine; his pigs are chiefly of English origin; he assured me he loses nearly ten per cent. from abscess of the liver. They gradually lose flesh, refuse food, pine away, and die. They never suffer from dysentery. On examining the bodies post mortem, the only abnormal condition ever found is an enlarged liver containing one or several abscesses.

More than one medical officer in this country have mentioned to me their conviction in the observance of the absorption of hepatic abscess and the recovery of the patient. Without questioning the loyalty of such conviction I believe this must be a misconception. If an abscess existed of sufficient size to be detected, and disappeared by any process not externally recognizable, it is most likely that it found exit unobserved through the hepatic ducts, or through some channel other than by absorption. The contents of an abscess of the liver could not as pus pass into the system by absorption and disappear unnoticed. It is described by Virchow that a disintegration as it were of pus by the absorption of its fluid constituents can occur, leaving only the solid parts, "pus concret," or it may disappear altogether, by undergoing a fatty metamorphosis. Some such process may possibly befal small collections of matter occasionally in the liver, but that abscesses large enough to be externally detected are likely to be so treated appears to me very improbable.

I shall conclude these observations with some remarks upon general principles in the treatment of acute hepatitis. It would extend this paper far beyond the intended limit to consider the subject in detail, and the investigation would be imperfect also without some previous consideration of the symptoms of the disease. The principle of treatment of most writers, and I believe of most practitioners in India, has been, and to some extent still is, a routine one. It may be described briefly as follows:—A cholagogue purgative in the commencement when admissible; the abstraction of blood followed by the exhibition of mercury, pushed to salivation or not according to circumstances. A still more uniform principle is universally recognized of discontinuing the use of mercury when the formation of pus is diagnosed. This treatment is modified in various ways, but a very general routine is exemplified, I believe, in the above; and has been extensively pursued by me.

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* By the kind permission of Surgeon Stewart I was enabled to take notes of this case while going through his hospital at Landour.

When mercury was first largely used and recommended in the treatment of hepatitis, for how many diseases was it prescribed and upheld by the most experienced and scientific practitioners? Besides its employment in syphilis, its use was almost universal in inflammations of organs, and most tissues, and very general in fever. In every disease for which it used to be employed, its exhibition has been greatly modified of late years, and in some it is now seldom prescribed. Probably in none, except in syphilis, has the reputation so pertinaciously adhered to mercury as in acute hepatitis in India. Nevertheless, while admitting its value in experienced hands in certain cases, I cannot subscribe to its exhibition as anything like an exclusive remedy in this disease.

The value of mercury in acute hepatitis is mainly founded upon its antiphlogistic, cholagogue, and deobstruent or resolvent powers. No specific efficacy is ever ascribed to it, as in syphilis, or as belongs to bark in ague, or sulphur in scabies. Is it, however, the most powerful antiphlogistic remedy, and is its cholagogue effect always very evident when given to affect the system? It is said that medicines which increase the secretion of bile may not injuriously interfere with hepatic inflammation, nay more, that by such action they may relieve it by relieving the portal circulation, the system engaged in the function of secretion; and that though the function of the hepatic artery is dual, its active office is chiefly nutritive. This physiological theory has always seemed to me to contain a considerable amount of practical truth, but I question much that mercury when given with opium to affect the system usually exerts any great cholagogue influence. It is said to check effusion and to promote absorption when it has taken place; no doubt this is the case, but where the tendency is to the formation of pus, it seems questionable that the change in the blood and condition of system induced by the free action of mercury is the best calculated to oppose it; practically it has often appeared to me not to be so. And in the somewhat anæmic European, the resident in the plains of India for a few years, the free use of mercury much deteriorates the health, not unfrequently permanently. More than seventeen years ago when at Chatham, I often meditated over the subjects of hepatic disease sent home from India, uncertain whether mercury or disease of the liver had done most to deprave the constitution. I cannot afford to pursue this part of the subject farther. It may not be out of place here to observe, that amongst soldiers who have served two, three, or more hot seasons in the plains of India, though leeches are generally indispensable, general bleeding in acute hepatitis in accordance with my experience is not often called for. In the sea ports of India, where full-blooded sailors, and other Europens recently arrived in the country, abound, no doubt general bleeding is more frequently requisite.

The principle, however, in the treatment of this disease is not to be lost sight of, that the effect should be decided and quickly produced. Three years ago when treating dysentery by large doses of ipecacuanha, I observed that where congestion, or functional derangement of the liver, co-existed, the symptoms were relieved almost as speedily as the dysentery, and was hence induced to exhibit ipecacuanha in acute hepatitis. Its use is generally combined with free leeching of the right hypocondrium, it is given in scruple or half drachm doses three times a-day, or according to circumstances, until the pain is relieved; diminishing the frequency of the dose usually after the second day. It may be necessary occasionally to precede its use by a few drops of tinct. opii. or a still better plan is the application of a mustard plaster over the region of the stomach, to enable that organ to retain it.* The modus medendi seems to be by quieting and equalizing the circulation, occasioning nausea and profuse diaphoresis, and frequently large bilious motions. It is sometimes necessary for the latter action to give some gentle purgative. A hot dry skin and quick circulation are generally mitigated if not altogether removed in 24 hours, and with the combination of leeches the pain in side is greatly relieved in the same period. It may be imagined that vomiting which is generally induced, would be most distressing, and occasion great pain in the liver from its pendent position and size; doubtless it does occasion distress, but practically nothing like what might be supposed; however, it is an objection to this medicine in acute hepatitis. My friend Surgeon Laing, of the 23rd Royal Welch Fusiliers, informs me that he uses no other medicine in this disease, and that his practice is remarkably successful, far more so than when he was in the habit of employing mercury, which drug he has latterly altogether discarded in these cases. Surgeon Laing's testimony is very valuable as he has the charge of a large European regiment from which he must have extensive opportunities of testing its efficacy.

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* This object may often be facilitated by giving the ipecacuanha in pills.

Mr. Cutcliffe, civil surgeon at Meerut, has been in the habit of employing the following special treatment in acute hepatitis with very great success. Antim. potas. tart. gr. ij. potas. nit. ʒij. to be divided into eight powders. He gives one of these powders every half hour, until pain in the hepatic region disappears, or is much diminished, which is usually in about eight hours. Should pain still exist the powders must be continued every two or three hours, according to the severity of the symptoms. If tenderness on pressure remains he applies leeches and fomentations, and exhibits hyoscyamus at bed time. The cases for which this treatment is to be relied on as curative are those of acute uncomplicated hepatitis, of recent date, even attended by the severest symptoms, which are liable to result in abscesses if not checked* I was induced to try this remedy, and can testify to its value, so far as experience for nearly a year in a regimental hospital can be taken as a criterion; all the cases in which I exhibited it thoroughly and rapidly recovered, and some of them had presented very severe symptoms on admission. I, however, nearly always employed leeches to a greater or less extent, and generally blisters when the acute symptoms had subsided. It creates, as can be easily comprehended, less sickness of the stomach than large doses of ipecacuanha, which is an advantage, but it is more liable to produce diarrhœa, this, however, can be remedied, if excessive, either by occasionally reducing the tart. antimonii, or by giving a little opium in the form of enema. These compound powders may be presumed in some respects to act upon the system in a somewhat similar way to ipecacuanha. It is necessary to exercise caution in giving them to very hard drinkers, as they are liable in such subjects to produce considerable depression; indeed, the same may be said of ipecacuanha. Pereira describes one of the effects of tart. antimon. as increasing the secretion of the liver. Its sedative effect upon the circulation and action upon the skin and kidneys are fully understood, and it is by no means inert in promoting the absorption of effusion. Nitrate of potas., in addition to its diaphoritic and diuritic effects, is well known to possess antiplastic properties, by which the diminution of fibrine is effected, which is much increased in the blood in inflammation. It possesses, also, other well recognized therapeutic properties antagonistic to inflammatory states of the system. It is a histological principle, moreover, that where transformations, as it were, in parenchymatous inflammations occur, the more speedy the effect of remedies the less likely are permanent structural and functional states to result. The remedial effect of these medicines, if effectual at all, is speedy, they cannot be long continued, and their action ceases with their omission. The constitutional effect is likewise transitory; no cachexia is left behind. If the diseases is cured, the convalescence has no opponent in the sequelæ of the medicines beyond the temporary debility. These observations on treatment are made with the view that dissemination may provide an ample trial.

It may occur that these remedies for congestion and acute inflammation of the liver may not obtain in all hands the value here assigned to them, this may arise from exhibition in unsuitable cases. The power of large doses of ipecacuanha in dysentery is very extensively recognised, but a reaction will very possibly set in from too much being expected of this drug. Dysentery under all circumstances will not always benefit as may be anticipated, and the want of success will tend to depreciate its value. Constitutions impaired by malaria, by scorbutic taint and syphilitic cachexia, or the condition of health arrived at by indulgence in intemperate habits are all unfavourable for this remedy, and these complications are equally adverse to the success of the remedies here advanced for hepatic disease. Experience may indicate other conditions which may render these medicines less effectual. It may be found, too, that when their antiphlogistic effects have been produced, and less acute symptoms continue, the exhibition of mercury may in some cases be advantageous, and remove recent structural changes that might otherwise progress to serious disease.

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* Vide "Indian Lancet" February 15, 1860.

ON ATHEROMATOUS DEGENERATION OF THE AORTA, AND ITS ASSOCIATION WITH SYPHILIS.

By Staff-Surgeon Peter Davidson, M.D., Netley.

The series of morbid changes so common in blood vessels, and known under the name of atheromatous degeneration, have not attracted that share of attention which their importance would appear to merit, more especially when studied in connection with the results of syphilis. Believed for a considerable period to be lesions chiefly coincident with advanced life or a fatty diathesis, originating also and existing to some extent, without any very obvious symptoms, they may have hitherto failed to excite and sustain the interest of the pathologist or physician.

As lesions, however, of frequent occurrence at comparatively early periods of life (as the abstracts of the cases appended show), probably associated also with several general morbid constitutional states, and especially as the forerunners of those destructive changes in large vessels, conducing to dilatation and internal aneurism (so frequent among soldiers), their pathological importance cannot be over-estimated. In a clinical point of view the facilities, which in certain conditions they may afford for the production of emboli, obstruction, obliteration of vessels, and gangrene of parts or of limbs, claim for them every attention; while at the same time they cannot fail, in the present day, to be generally interesting, considered in their relation to degeneration of the cerebral blood-vessels.

The destructive changes referred to comprise in the aorta those masses or collections of degenerated material of varying degrees of consistence, from soft and pultaceous to tolerably firm and cohering; elevated white or semi-cartilaginous-like patches; a corrugated or irregularly wrinkled condition of the inner surface; small superficial white spots, specks, or streaks; loss of substance, assuming the form and appearance of ulcers; cicatricial-like contraction and puckering at points; and the hard earthy formations or plates usually termed calcareous or ossific.

Gluge and Bizot first indicated the fatty nature of these so-called atheromatous deposits in blood-vessels; but Mr. Gulliver in this country, independently of their observations, pointed out that the change was essentially a fatty and calcareous degeneration, affecting both the internal and middle coats of the arteries.

On microscopic examination these degenerating masses exhibit a variety of histological elements. In the soft pultaceous condition the following can generally be recognised* (Nos. 3 and 9): "irregular, yellowish, opaque masses, composed of the remains of tissues infiltrated with granular material; quantities of granular matter, chiefly fatty, sometimes free, sometimes cohering and forming globular bodies; oil globules of varying magnitude; rhombic plates and irregular glistening angular fragments of cholestearine; calcareous masses and clear, spherical crystals of carbonate of lime, yellow by reflected light, and soluble in acids, with effervescence; as also a quantity of minute, clear, calcareous spherules, and bright, shining molecules, soluble in acids, which would seem to resemble those calcareous particles referred to by Dr. Jenner ("Medical Times and Gazette," January 31st, 1852), as occurring in disease of the cerebral vessels.

In the less advanced condition of these atheromatous collections, when, as yet, softening or solution of the elements has not taken place, they at first appear as opaque masses of cohering granular material, and dark yellow or dim white in colour, according as the light is transmitted or reflected. On breaking up such masses, or partially resolving the fatty elements (which in this condition appear chiefly in the granular form), the constituents previously mentioned come into view (No. 10), and will be seen to be infiltrating a fibrous basis chiefly composed of connective tissue. In some cases fatty elements and cholestearine appear to predominate, in others calcareous.

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* These microscopic preparations are preserved in the collection of the Army Medical School.

Of the origin of these atheromatous masses, and the morbid processes generally which are antecedent to their formation, opinion has varied. Referring to older writers, Kreysig, Bouillaud, and Bertin attribute them to the results of acute inflammation; Hodgson and Haller to a transition from a purulent fluid; and Andral and Lobstein (the latter of whom has given an admirable description of the lesions) considered them as the result of an albuminous exudation between the tunics, consequent on perverted nutrition. Some again (Cyc. of Practical Medicine) have ascribed them to a depraved action (non-inflammatory), called into activity by over-distension; while Hope, Copland, Craigie, and others believed them to be consequent on some chronic inflammatory process. These views were given forth at a period when the nature and constitution of the adventitious matter were not understood, and are therefore merely speculative and theoretical, and probably only interesting in contrast with the views of more recent observers, and a more ample knowledge of the pathology of the subject.

Hasse considered these formations as deposits between the internal and middle coats, referable to some constitutional cause, and Bizot also held similar views; Rokitansky considered that the atheromatous material was one form of metamorphosis of the white patches (the calcareous being the other), he believing those white patches to be deposits on the lining membrane; while Wedl and Engel regarded them as the degeneration of a low form of exudation, into the annular fibrous layer, connected with a hyperæmic condition of the cellular coat, and perhaps also of the annular layer. Virchow (to whom the credit belongs of directing observation to a right interpretation of the change) pointed out "that these collections of soft material represented a fatty metamorphosis of the cell elements of the fibrous layer of the inner tunic; that preceding this fatty metamorphosis, a stage of irritation exists, similar to the stage of cloudiness, swelling, and enlargement in inflamed parts generally, and that the enlargement of the tissue depends on an increase in size of the cell elements, with multiplication of their nuclei, in some cases division of the cells. These cellular elements become the seat of the fatty degeneration. The process he considers, therefore, a formative one, involving the inner coat, and the local starting point he believes to be an inflammation of this coat, exactly similar to endocarditis, with the exception that the one represents a chronic, the other an acute process.

A study of the changes antecedent to the formation of these masses, and coincident with their production, is probably most easily obtained by examining sections of an aorta, previously slightly hardened in spirit, and at points where the lesion has not advanced too far. Selecting a mass somewhat localised, and cutting it out along with some of the adjacent portion of the wall, by rolling this on itself somewhat firmly, in the direction in which it is desired to cut, good continuous transverse sections of the roll can very conveniently be obtained, with the ordinary knife or razor. In such sections (Nos. 1 and 2) tracing the change outwards, as it were, from the central softening portion towards the circumference, the atheromatous material will be seen as a darkish opaque mass, taking the place of the two inner tunics, but especially of the inner. Towards the circumference of the mass, as it begins to be lost in the surrounding tissue, it appears to be confined to the deeper portion of the inner tunic, with an abrupt, well defined, dark, outer border, lying on the middle tunic, and towards the inner surface, shaded away into the tissue composing the inner coat. At this portion of the section the inner coat is much increased in thickness, and this is chiefly due to a great increase of connective tissue, which seems to have replaced the normal texture of the tunic. In this connective tissue a very large number of spindle-shaped cells may be seen, distinctly nucleated towards the inner surface, becoming towards the deeper strata more and more abundant (proliferation), losing their nuclei, becoming larger and darker, and filled with dark granular contents, until they are lost or obscured at last in the general mass of degenerated material. The conditions appearing to exist at the point, where the mass is forming, would seem to be "increase of the connective tissue of the inner coat, intense proliferation of the cells of this tissue, and degeneration, or retrograde change in the contents of those cells," which by gradual accumulation form those collections of so-called atheromatous matter.

On reviewing the various steps of this formative process, it may be remarked, that a series of phenomena present themselves, analogous in all respects to those of the development of new formations or growths. The formation of atheromatous matter from connective tissue, by a successive proliferation and retrograde transition of its cell elements, would seem to mark a process identical with that of the formation of growths such as cancerous, tubercular, syphilitic, and the like.

Of the nature of the white, or semi-cartilaginous like patches, and the processes by which their formation is produced, some diversity of opinion has also existed. Hasse considered them as deposited *on* the inner surface of the vessel, and probably derived from the blood; Bizot and Walsh, as altered plastic material, exuded *on* the free surface; Rokitansky as deposits from the blood; Wedl, as a further stage in the exudation process previously mentioned; and Virchow as the enlargement, or swelling, as it were, consequent on the formation of the atheromatous mass, and the formative processes coincident with, its production. His investigations and delineations of the changes found in these patches, show the errors into which many previous observers had fallen, relative to the formation of the patches on the free surface of the vessel. These patches occur either isolated, or in aggregated masses, more or less firm and dense in consistence, and considerably elevated above the general surface. They do not manifest themselves particularly on the outer surface, nor show any corresponding irregularity of surface there when the areolar coat is stripped off. Their general structure is most conveniently seen in sections, obtained as previously described, and it is advisable that small, well-formed patches be selected for examination, so that the section may embrace, not only the structures composing the patch, but a portion also of the adjacent tissue.*

The conditions which seem most generally to exist in such sections (No. 8), are, that a very great increase of connective tissue, with proliferation of its cell elements, has taken place in the inner tunic, taking the place entirely of the normal texture, the thickening sometimes amounting to the twentieth part of an inch. An irregular line of degenerated material invariably occupies the deeper stratum, with a dark, abrupt, outer border, resting on the inner layer of the middle tunic, and merging internally into the degenerating stratum of cells. The epithelial layer does not appear much thickened. The middle or annular coat, though occasionally somewhat granular, appears otherwise normal, and the elastic lamellæ distinct. The elevated white patch in fact appears to be chiefly due to growth of connective tissue in the inner tunic, overlying a mass of degenerated material.

Of the corrugated state of the vessel, in which the inner surface appears irregularly wrinkled or furrowed, it would seem in some respects to differ from the condition just described. The walls of the vessel in this condition seem comparatively thinner, and the pursed up, contracted elevations on the inner surface appear to be accompanied with a corresponding irregularity on the outer surface, especially marked when the areolar coat is stripped off. Seen in section (Nos. 6 and 7) under the microscope, an altered condition of the middle coat attracts attention. It retains little of its relative thickness; here and there in its substance collections of degenerated material have accumulated, and the tissue of the tunic when it can be seen, appears atrophied and granular, the elastic lamellæ lying close together, or separated only by thin lines of granular material. The inner tunic invariably participates more or less in the changes previously described as taking place in this coat, viz., considerably increased thickness from growth of connective tissue, with masses of degenerated substance in its deeper strata.

The general conditions, therefore, which seem to prevail in this state of the vessel are—"increased connective tissue in the inner coat, associated with and overlying an atrophied and degenerated substratum, extending to and involving the middle coat." By the gradual contraction of the connective tissue, the inner surface becomes irregularly elevated and corrugated.

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* In sections of the walls of the aorta the point of obliteration of the ductus arteriosus should be avoided.

These conditions may probably be considered, therefore, as representing a further, or at all events a graver stage of the destructive change; at least in so far as the activity of process would here seem to tend to a retrogade change, or decadence, in the cell elements; while in the previous condition the tendency was to the formation of tissue.

Coincident with these changes in the deeper portion of the walls, there generally also exist at points superficial accumulations, immediately underlying the epithelial lining. It is to those superficial accumulations, where the deeper destructive change does not obscure their presence, that the appearances so frequently seen, of small white spots, specks, or streaks, are due. On section (No. 5) these accumulations appear as irregular, dark, comparatively limited masses, immediately underlying the epithelial layer, attended with no growth of tissue in the immediate neighbourhood, seeming to be chiefly composed of fatty granular material, and to be (as Virchow has shewn) the result, of a simple, fatty metamorphosis of the cells of the connective tissue at this point, a process involving no formative action, but simple degeneration of existing cell elements.

Loss of substance on the inner surface, in the form of circular or irregular excavations resembling ulcers, are of frequent occurrence; and although the views of older writers, regarding such excavations being the result of a true ulcerative process, are at the present day by many recognised as correct, it appears likely, (as Rokitansky and others have shewn), that the solution of surface is but the result of a simple disintegration of softening masses, and hardly analogous to true ulceration. In a section of a small excavation (No. 11) such as those described, it is seen that on each side of the excavation the dark degenerating mass occupies the whole thickness of the inner coat, reaching the epithelial surface; and that apparently a solution and disintegration of the central part has taken place, some irregular softened portions still appearing to adhere to the floor of the excavation. When these conditions have existed some time, the circumference of the excavation becomes beset with fibrinous coagula, occasionally stratified, to which, and the contraction of the neighbouring connective tissue the irregular, jagged, and puckered appearance of the edges is due.

With these conditions there not unfrequently co-exist cicatricial or scar-like contractions, which there is every reason to believe, are in certain instances the result of absorption of atheromatous collections, and analogous to the puckered, cicatricial-like appearances on the surface of the lungs, liver, and other organs, the result of tubercular or syphilitic growths. It is at the same time probable that similar appearances may be, as many have supposed, the result of the contraction and closing of excavations. In sections through some of these cicatrix-like contractions a small dark-coloured line, or remains of a canal, could be observed passing inwards from the surface to the deeper strata of the wall, leading to the supposition that an excavation had previously existed at this point.

Of the nature and origin of the hard, earthy formations termed calcareous cretified, or ossific, some doubt has existed, and confusion has also resulted from the use, in an indiscriminate and too general sense, of the latter term. Valentin, Bizot, Walsh, Wilks, and others have inclined to the belief that they are calcareous; while Virchow considers that they are real bony formations, a further termination of the formative process, and developed from the same tissue from which, in other cases, the atheromatous material arises. The balance of evidence would seem to favour the previous belief, in so far that none of the structural elements or formative processes of osseous tissue can be traced in these plates, which, in most cases, in an early stage exhibit simply irregular, earthy accumulations, infiltrating a basis of connective tissue. The conjoint calcareous and fatty metamorphosis also, which can be traced in the degenerating remains of the connective tissue corpuscles, as well as the occasional predominance of the earthy over the fatty transition, would seem to suggest that the atheromatous masses and hard plates are the result of one and the same process.

Organic lesions in the walls of vessels have from remote periods been remarked as frequently associated with syphilis and its cachexia.

Lancisi, Morgagni and others, prior to the commencement of the present century, have left on record that those affected with *lues venerea* were particularly predisposed to ulceration and disorganisation of the aorta. Scarpa, confirming these statements, remarks that a great number of observations have successively demonstrated that patients affected with lues venerea are much more frequently than others, the subjects of steatomatous ulceration of the internal coats of vessels. Hodgson likewise, some few years later, says that from his own observations he had found aneurism and the organic alterations which generally attend this condition, to be frequent in subjects who had died from venereal disease, and who had taken large quantities of mercury, adding, at the same time, that it appears by no means improbable that the internal coats of arteries may be one of those parts over which some specific diseases may exert their peculiar influence.

More recently, although similar views have been occasionally expressed (Walsh and Wilks), and cases now and then recorded (Burrows, "Lancet," Jan. 25, 1856, and Lewer, R.A., "Army Medical Reports," 1862), where such lesions of vessels were associated with and seemed to result from syphilis, the frequent predisposition to such lesions exerted by this morbid constitutional state may probably not have been realised.

At the post-mortem inspections conducted by Dr. Aitken, Professor of Pathology at the Army Medical School, the association of such lesions in the aorta, with cases of marked syphilitic history, has been a frequent subject of remark by him, and the following short tabular analysis of these necropsies extending over a considerable period, as also abstracts of cases illustrative of this subject, may probably be of interest.

TABLE I. Shewing the Total Number of Cases forming the subject of analysis arranged in three Classes.

Class I, with marked Syphilitic History.	Class II, with doubtful Syphilitic History.	Class III, with no History of Syphilis.	Total Number of Cases.
28	8	78	114

Class I includes all cases in which the documentary, general, and post-mortem evidences of syphilis were sufficiently complete to leave no doubt of a marked syphilitic history. Class II includes those cases in which such evidences were incomplete and doubtful; and Class III those cases in which no trace or evidence of syphilis existed.

TABLE II. Shewing the numerical and relative frequency of Atheroma of the Aorta in the above three Classes.

Classes of Cases.	Total Number.	Number in which Atheroma of the Aorta was present.	Ratio per cent.
Class I, with marked syphilitic history ..	28	17	60·7
Class II, with doubtful syphilitic history	8	1	12·5
Class III, with no syphilitic history	78	4	5·1

The succeeding seventeen cases are those of Class I in which atheroma was present.

The single case in Class II was associated with a history of tuberculosis.

Two of the cases in Class III were associated with tuberculosis, and two with cardiac disease.

CASES OF ATHEROMATOUS DISEASE OF THE AORTA, CO-EXISTING WITH A MARKED SYPHILITIC HISTORY.

Case 1.—Sergeant J. A., 87th Regiment. Age 22 years. Contracted syphilis in August 1860, followed by secondary eruptions and severe syphilitic cachexia; death from syphilitic cachexia and exhaustion. P.M. appearances, December 13, 1861—copper-coloured blotches on the skin, softened nodes, cicatricial loss of substance on the surface of the liver, amyloid degeneration of liver, and deposit in both testicles, *opacity of the lining membrane of aorta, with corrugation and deposit.*

Case 2.—Private H. W., 25th Regiment. Age 27. Suffered from syphilis and sore throat in the early part of 1861, followed by general ill-health; death fromalbuminuria and cystic disease of the kidneys. P.M. appearances, January 13, 1862—solitary nodular growths in the left lung; large condensed fibrous growth on the surface of the liver; a similar but smaller one on the spleen; amyloid kidney; *atheromatous degeneration, and scar-like loss of substance in the aorta.*

Case 3.—Private H. S., 7th Regiment. Age 22. Was five times under treatment (in all 105 days, between January 1859 and 1860), for syphilis, which was immediately followed by general ill-health and bronchitis, culminating in phthisis; death from phthisis. P.M. appearances, June, 1862—granular tubercular infiltration, semi-transparent deposits (some undergoing cretification) and cavities in both lungs, *loss of substance on the inner surface of aorta, with considerable contraction.*

Case 4.—Gunner M. M., R.A. Age 33. No documentary history of syphilis (abstract wanting), but suffered from marked syphilitic ulcers on the ankles; also nodes on the tibia and sternum; cause of death, ascites and exhaustion consequent on enlarged liver. P.M. appearances, June 8, 1863—ulceration of both tonsils, cretaceous deposits in the apex of the left lung; cicatricial loss of substance, on the surface of liver; amyloid liver and spleen; *atheromatous degeneration, and cicatrix-like loss of substance in the aorta.*

Case 5.—Private J. N., 103rd Regiment. Age 33. No documentary history of syphilis; has deep cicatrices of ulcers on the penis; death from phthisis pulmonalis. P.M. appearances, June 26, 1863—irregular thickening of the calvarium; cicatricial loss of substance on the external table; nodular swelling on the right parietal bone; cavities and hard semi-cartilaginous-like deposits, in both lungs; cicatrix-like loss of substance on the surface of the liver; amyloid liver and spleen; *cicatricial loss of substance, and atheromatous deposit in the aorta.*

Case 6.—Private W. E., 81st Regiment. Age 29. Suffered severely from syphilis, primary and secondary; cause of death, hepatitis. P.M. appearances, June 29, 1863—cicatricial loss of substance on the external table of skull; nodular growth in pericranium; thickening of inner table of the skull; ulceration of both tonsils; nodular deposits and loss of substance on the surface of liver; *cicatrix-like loss of substance and yellow atheromatous deposit in the aorta.*

Case 7.—Private A. M., 82nd Regiment. Age 36. Suffered from syphilis and necrosis of the frontal bone; has had acute rheumatism; cause of death, hepatitis. P.M. appearances, July 9, 1863—ulceration and necrosis on the frontal bone, with yellow (gummatous) deposit surrounding; thickening of the calvarium; a solitary nodular deposit, both lungs; cicatricial loss of substance and deposits in the liver; loss of substance on the surface of kidneys; amyloid spleen and kidneys; *atheromatous degeneration, and considerable loss of substance of the lining membrane of the aorta.*

Case 8.—Private G. B., 17th Lancers. Age 25. Had syphilis in 1859, and also in 1861, followed by secondary syphilis, anæmia, and general ill-health; cause of death, chronic dysentery. P.M. appearances, October 29, 1863—cicatrices of ulcers on the penis; enlarged inguinal glands; thickening of calvarium; two solitary nodular deposits in the apex left lung; loss of substance and deposits on surface of liver; deposit in each testicle; *atheromatous degeneration, and considerable loss of substance in aorta.*

Case 9.—Private J. McM., 100th Regiment. Age 23. Had syphilis in 1861, followed by general ill-health, terminating in phthisis. P.M. appearances, December 3rd, 1863—great porosity of the inner table of the skull, solitary white deposits in the kidneys. amyloid liver and kidney, *cicatricial loss of substance to some extent in the aorta.*

Case 10.—Private W. M., R.E. Age 29. Suffered from syphilis in 1860, and subsequently from chronic bronchitis. While under treatment for this affection, cerebral symptoms and paralysis supervened; cause of death, cerebral softening. P.M. appearances, December 29, 1863—deep excavated cicatrix on the glans penis, cicatrices of rupia on back and limbs, solitary nodular deposits in the lungs, cerebral softening in each hemisphere of the brain, *degeneration of the coats of the aorta with opaque deposits here and there.*

Case 11.—Private J. J., 48th Regiment. Age 28. There are no documentary records of this case prior to 1860, but he had marked cicatrices of old ulcers on the penis, with surrounding induration; cause of death, phthisis pulmonalis. P.M. appearances, April 20, 1864—livid cicatrices on the extremities; cicatricial contraction on the surface of the right lung; cavities in the left; evidences of old ulceration of the throat; cicatricial loss of substance on the right kidney; amyloid liver; *degeneration, yellow deposit, and loss of substance of the aorta.*

Case 12.—Private W. M., 2nd Dragoon Guards. Age 29. Suffered from syphilis severely in 1861; cause of death, paralysis from cerebral disease. P.M. appearances, May 4, 1864—thickening of the calvarium, and porosity of the inner table of the skull; yellow circumscribed deposit in the left hemisphere of the brain, and loss of substance of the convolutions; loss of substance of both tonsils; small solitary growths in the liver, with cicatricial loss of subtance on the surface; *aorta sacculated, intense corrugation, with adherent masses of fibrine, and a deep excavated ulcer in the arch.*

Case 13.—Gunner R. G., R.A. Age 25. Suffered from two attacks of syphilis in 1861, followed by extensive ulceration of the tonsils and fauces, and general cachexia; cause of death, exhaustion from cachexia and ague. P.M. appearances, June 9, 1864—cicatrix of a deep ulcer on the penis; livid cicatrices on the shins and wrists; hæmatoma of the dura mater; ulceration of the tongue, tonsils, and fauces; deep cicatricial depressions, and solitary nodular deposits in the liver; solitary deposits in both testicles; *corrugation, degeneration, and loss of substance of the aorta.*

Case 14.—Private J. B, 18th Regiment. Age 27. Suffered severely from syphilis and bubo in 1862, followed by general ill-health; has a deep cicatrix of an old ulcer on the penis; cause of death, hepatic abscess. P.M. appearances, July 1, 1864—Porosity of the inner surface of the calvarium; cicatricial loss of substance, surface of the spleen; *cicatricial loss of substance, and thickening of the lining membrane of the aorta.*

Case 15.—Private S. H., 11th Regiment, age 32, has had syphilis; date unknown. Has livid cicatrices on the shins, and nodes on the tibia. Cause of death, rupture of an aneurism. P. M. appearances July 4th, 1864: Numerous cicatrices of ulcers on the penis. Great enlargement of the Pacchionian bodies; symmetrical, circumscribed, nodular deposits, apices both lungs; cicatricial contraction surface of the kidneys, with remains of deposit. *Intense degeneration and corrugation of the coats of the aorta, and an extensive aneurism in the thoraic portion.*

Case 16.—Gunner J. L., R.A., age 26, had two attacks of syphilis in 1862, succeeded by general ill-health. Cause of death general exhaustion and scorbutic diarrhœa. P. M. appearances, October 12, 1864: Great porosity inner surface of the calvarium; cicatricial loss of substance on the frontal bone; hæmatoma of the dura mater; solitary nodular deposits in the left lung. *Degeneration and cicatricial loss of substance in the aorta.*

Case 17.—Private J. S., 15th Regiment, age 39. No documentary record of this man's case prior to 1860, but he has the cicatrix of a deep ulcer on the glans penis, with a hard circumscribed centre, and a large node on the right tibia. Cause of death rupture of an aneurism of the thoracic aorta. P. M. appearances November 1st, 1864: Porosity of the calvarium, with cicatricial loss of substance; loss of substance in both tonsils; two solitary nodular deposits in the apex, right lung; cretaceous remains in the apex of the left; loss of substance surface of left kidney; deposit in the left testicle. *Extreme degeneration of the aorta; corrugation of the coats, and an extensive aneurism in the thoraic portion.*

From these cases it will be remarked that the lesions in the aorta were found in three instances between the ages of 20 and 24, in nine between the ages of 25 and 29, in three between 30 and 34, and in two between 35 and 39.

In four cases tuberculosis was present, and in one a history of rheumatism. There was no record in any of the cases of mercury having been taken to excess.

NOTE ON THE TREATMENT OF ENLARGED SPLEEN WITH BINIODIDE OF MERCURY.

By Professor MACLEAN, Royal Victoria Hospital, Netley.

THE biniodide of mercury is a therapeutic agent too little known and appreciated in this country.

On the actions and uses of this salt, Professor Christison thus expresses himself:—

"It has been recently recommended by some physicians, under the idea that it must combine the deobstruent virtues of both its elements. No proof to this effect has hitherto been published; and though its effects in strumous disorders are represented to be more speedy than those of iodine itself on the other metallic iodides, further evidence seems necessary to justify the good opinion entertained of it by some. It is said to possess the property of inducing salivation, like other mercurial compounds, and upon the whole there is reason for thinking that, as a physiological and medicinal agent, it associates itself rather with mercurials than with the preparations of iodine. In large doses it seems to be an irritant poison."

I am informed by my colleague, Dr. Parkes, that the late Dr. A. T. Thompson was in the habit of prescribing this salt, in very minute doses, for the cure of *lupus*, and with such success that cases of this intractable affection were sent to him from distant parts of the country for treatment. But it was in India that the value of this therapeutic agent was first discovered, and, strange to say, not by a member of the medical profession, but by two military officers of the Bengal Army, viz., Major Holmes and Captain Cunningham. Those officers were for many years employed along the line of the Terrai, where goitre is an endemic disease to such an extent that "one person in ten of the population" is said to be afflicted with this disfiguring disease. Dr. Mount, of the Bengal Army, published in the eighth number of the "Indian Annals of Medical Science" a narrative of the successful application of the biniodide of mercury in the treatment of goitre by the officers mentioned above. This article appears to have excited much less attention in the profession than it deserves. The only writer on Practical Medicine who appears to have noticed the labours of Major Holmes and Captain Cunningham is Dr. Aitken, whose industry and research are such that few things escape him.

Captain Cunningham appears to have, in the first instance, used iodine uncombined. Having been disappointed in its effects, he was subsequently led to make a trial of the compound salt—the biniodide of mercury.

He prepared an ointment by melting 3 lbs. of lard, or mutton suet, to which, when strained and nearly cool, 9 drachms of biniodide of mercury, finely triturated, were added. This ointment was applied to the goitre with an ivory spatula; with this it was rubbed in for fully five minutes. The patient was then made to sit with his goitre exposed to the sun as long as he could endure it. Some blistering follows this exposure, and in the afternoon the ointment was again applied "with a tender hand," and the patient sent home. Except in goitres of extraordinary size, no other application was necessary. The success that attended this treatment was remarkable, Captain Cunningham and his assistants having cured upwards of 60,000 cases in this manner, failure being a rare exception.

The above particulars are given in much greater detail in the article already referred to. They are repeated here because they do not appear to have attracted so much attention in this country as they deserve.

Dr. Macnamara, of the Bengal Army, has since, in the 15th number of the same valuable journal, published the results of upwards of 23,000 cases of goitre treated in the same manner. In his hands the remedy has been quite as effectual as in those of the military officers who first used it. "I have often," says Dr. Macnamara, "seen tumours of this kind (goitre) extending from the chin to a line drawn from between the mammæ disappear after two applications of this drug." My esteemed friend Dr. Alexander Grant, late of the Bengal Army, informs me that he has been at some pains to introduce the biniodide of mercury into Switzerland, as a remedy against the goitres of that country.

Goitres, however, are so seldom seen in military practice that if this remedy had no other application, the above facts would only have an interest of a general kind for military surgeons; but the biniodide of mercury is nearly as useful in the treatment of enlarged spleen as in goitre. That the spleen undergoes changes in size, structure, and consistence under the influence of the poison of malaria, is one of the most familiar facts in pathology. Some of these changes are doubtless due merely to mechanical causes arising during the phenomena of the febrile state, when this "ductless vascular gland" performs the part of a *diverticulum*. But the solid enlargements of the spleen so often seen in the persons of invalids from malarial regions, arise mainly from increased cell formation, due to the irritation of the poisoned blood. The size to which this organ attains under the influence of *malaria* is very great; spleens weighing eleven and twelve pounds are not uncommon, and cases where they have attained thirty pounds are recorded. At Netley we have a constant succession of invalids in whom this organ is found to extend down into the pelvis, occupying a large part of the abdomen, often with enlarged liver and ascites. In recent cases, before this increased cell development has taken place, it is often a mere bag of blood, and fatal occurrences are not uncommon in India from blows inadvertently struck over the ribs of men in this condition, resulting in immediate rupture of the gland.

Before solid enlargement is established it is by no means a difficult thing to reduce the spleen to its normal limits and condition. Immediate removal to a non-malarial locality is of course the first step, the use of quinine and the preparations of iron, with a course of blood depurants, and a nutritious diet, are the most effectual means at our disposal. When, however, the spleen has become hypertrophied, so as to attain to a large size, it is an extremely difficult thing to make an impression upon it; and if the condition of lucæmia be established I know of no treatment likely to avail except that by the external use of the biniodide of mercury, applied in the manner so successfully used for the cure of goitre. I was led to make trial of this salt in such cases from its efficacy in goitre, and from having heard of some successful trials of it in this direction in India. The result has exceeded my most sanguine expectations. In no case has it been inefficacious, and in some the effect of the remedy has been very striking, reducing the enlarged organ with great rapidity to nearly its normal dimensions. This result has been attained in many cases of a most unpromising character in men whose constitutions have been much impaired by long residence in malarious regions.

I am so averse to the use of mercurials in malarial diseases and their sequels, that if any constitutional action of a depressing kind followed the use of this active salt I should be very unwilling to prescribe it. But in not a single example has any such effect occurred in my trials; and out of the vast number of cases in which the binodide has been used in the treatment of goitre in India, salivation has been observed only in one or two examples.

The mode of procedure at Netley has been extremely simple; I have used an ointment of the strength of the old officinal preparation, the *unguent* hydrarg biniodide. A piece the size of a nutmeg is rubbed in over the affected gland with a spatula, the patient is then directed to sit before the fire until a good deal of smarting is occasioned. About half the quantity is again applied lightly over the tender surface. Some blistering follows, and the raw surface is dressed like an ordinary blister. The process is repeated in about a fortnight or three weeks, according to circumstances. Two or three applications in general suffice, and the local treatment is aided by the judicious use of such remedies as quinine, iron, and a proper diet. If the patient is suffering from any form of malarial fever, that, of course, must be arrested before any benefit need be expected from this or any other form of treatment.

My colleague, Staff-Surgeon Fyffe, who has carefully watched the cases in which this mode of treatment has been followed, has expressed his satisfaction with the results in the Annual Report of the Medical Division of the Royal Victoria Hospital for 1864; and since that report was written many other cases have been successfully treated.

I have also used it in some cases of enlarged liver from malaria with equally good results.

It will thus be seen that this salt is really a valuable therapeutic agent, well worthy of a more extensive trial in a class of cases that I know, from much experience, are very intractable, but which may now be regarded as brought within the yearly increasing domain of curative medicine.

ARSENIC IN INTERMITTENTS IN INDIA.

Abridged from a Notice by Surgeon-Major Turner of the Bombay Medical Service, in his Annual Report.

"Intermittent" fevers prevail during the wet weather, and are complicated chiefly with hepatic and splenic congestion; while in the type designated "remittent," and which mostly prevail after the cessation of the rains, cerebral disturbance is a dangerous feature, and depraved biliary secretion no unusual concomitant. In treating the former, Mr. Turner, gives a sulphate of zinc emetic "which like other emetics does not depress the nerve tone" and a mercurial purge, and then entirely trusts to the administration of *arsenious acid*, as it exists in Fowler's solution, to the extent of half drachm or drachm doses of the latter, every second hour, until four, five, or even six drachms have been taken. This he does in anticipation of the expected paroxysm. It may be given to children, with perfect safety, in fifteen minim doses. Quite as satisfactory results (if not more so) may thus be obtained, as from the more expensive quinine, so generally used.

Having used it both at sea and on shore in all varieties of country, he can speak confidently on the subject. He cites the very decided testimony of Dr. Broderick, of Indore, as to its safe and successful employment in the large dispensary practice there; and the more cautious opinion of Dr. Pope as to the equal success of the arsenic and quinine modes of treatment in his experience. Mr. Turner is of opinion that the enormous expense to Government of the present quinine supply, and cinchona plantations, might be spared by the substitution of his favourite solution.

Mr. Turner prefers the arsenic on several grounds. There is none of the cerebral disturbance (quinism) so common after quinine, and he describes it as a more powerful "nerve-toner" than the latter. Neither does it seem in Mr. Turner's hands, to have produced gastric or other irritation, nor purging or vomiting. He cautions against its employment, however, in cases where it might injuriously check the menstrual flow, and takes the opportunity of recommending it highly, alone or with scruple doses of camphor, in obstinate menorrhagia, and in the resulting hemicrania or brow ague.

Dr. Broderick is stated to have combined—with the happiest results—the two remedies in the treatment of cases of intermittent fever and brow ague which had resisted the administration of either drug separately.

TREATMENT OF CHOLERA WITH STRYCHNIA, WITH NOTES OF ILLUSTRATIVE CASES.

By Wm. Hensman, Esq., Assistant-Surgeon, 2nd Battalion, 20th Regiment, Yokohama, Japan.

During an epidemic of cholera at this station last autumn, an opportunity was afforded me of practising a line of treatment, which, as far as I am aware, has never been advocated; and which, looking at the well-known therapeutical claims of the medicine, has been undeservedly overlooked.

The exact nature and causes of cholera have remained in so much obscurity, that the choice of remedies has necessarily been speculative and unsatisfactory; insomuch, that with respect to those hitherto tried, no greater success has attended their use, than to leave it undecided whether as many cases would not have recovered, had they been left to nature.

The existence in cholera of a marked asthenic condition of the nervous systems, and the well-known hypersthenic action produced by strychnia, induced me to believe that if its special stimulant influence, short of spasmodic action, could be enforced upon the nervous centres, it would rally their sinking powers, and counteract the depressing influence under which they suffered. It appears certain that the attack of the cholera poison is exerted chiefly against the nerve of organic life; that arrest of its nervous energy involves the arrest also of the functions over which it presides—secretion, nutrition, a share in respiration and circulation; its vaso-motor power, that capillary stasis at once ensues; that that extensive tract and plexus of capillaries, forming the intestinal circulation, deprived of tone and innervation, becomes congested and distended; transudation of its watery, saline, and organic contents takes place in the order of their greatest mechanical facility for so doing; and exfoliation of the mucous membrane follows, whilst the absorbent function of the alimentary canal is interrupted by vascular repletion, and infiltration of the mucous membrane (and here I would remark, that exudations of a rice-watery character are found, not only in the intestinal, but also in other mucous membranes where the same causes operate; for instance, in the ducts of the liver, the internal surface of the gall-bladder, the pelvis of the kidney, &c.; wherever the mucous membrane and capillaries lose their innervation and tone, there exfoliation of epithelium and transudation of albuminous fluid occur); consequently, the character of the portal blood at the liver is altogether changed; its viscidity is much increased, the alimentary products are absent, the principles of bile have not been re-absorbed; moreover, the active function of the gland is suspended, and bile and sugar are not produced; and, therefore, the blood passing along the hepatic vein into the inferior vena cava is deficient of those very materials which seem to be specially provided by the liver for purposes of respiration and animal heat. But the blood in the vena cava is returning from the systemic circulation impure; it has passed the kidneys without being freed from its urea, and a strong endosmotic current from the tissues, along its entire course, has loaded it with effete and unnatural materials, so that the united currents reach the lungs in this condition, infected with urea—*minus* its hydro-carbon—deficient in its watery and saline materials; its corpuscular form changed, and its albuminous and fibrinous condition deteriorated and altered; for the lacteal and lymphatic systems, unsupported by the subtle agency of the nerve of organic life, cease to accomplish their proper purpose in the economy. Its passage then, through the lungs, is unattended with combustion, (on the contrary, respiration effects a rapid cooling of the whole mass of blood,—other sources of animal heat notwithstanding,—until death ensues, and this refrigerating process ceases; when a brief continuance of active chemical change in the capillaries restores to the surface that sensible increase of temperature, which is a remarkable phenomenon after death in cholera; atmospheric air enters, and is expired again without changing its temperature. The breath is cold. Some oxygen passes into the circulation and combines elsewhere in the systemic capillaries to form more urea, &c., but healthy circulation is gone; nutrition and repair, and ganglionic agency are everywhere stayed, whilst disintegration of the tissues, and contamination of the blood are rapidly progressing.

But the cerebro-spinal functions suffer, though not equally with the sympathetic; witness the insensibility of the skin to external stimulants, though this, probably, is equally due to a want of power in the vaso-motor nerves of the capillaries to respond to impressions made on the cutaneous nerves, also the apathy—the listless indifference to the issue of the terrible struggle going on, and the loss of control and spasmodic action of the voluntary muscles. All these symptoms are evidences that the influence of the poison over the nervous system extends far and wide, whilst their moderation, after the administration of the remedy, renders it probable that the whole nervous system is susceptible of the excitant power of strychnia, though the coarser manifestations of its action refer themselves to spinal exaltation alone.

The method of administration I would recommend is to give such doses of the medicine as shall produce the slightest expression of its therapeutical effects, and this will differ according to the stage of the disease and the severity of the collapse; in moderate collapse, with failing circulation, cold hands and feet, rice-watery stools, and frequent spasms, from ⅛th to ¼th part of a grain, dissolved in weak spirit, every half-hour until amendment takes place. I found generally after the second dose, or third, a visible improvement; the spasms were quieted, the pulse was steadier and fuller, and the countenance better. In cases of more severe collapse, I would give ¼th part of a grain at once, and repeat it twice or three times at intervals of thirty minutes; most of the cases recorded below were of this kind, and reaction took place in the following order:—the cramps ceased; the pulsation at the wrist became stronger, the countenance lost its ghastly aspect, warmth returned to the feet and hands, and the rice-watery character of the evacuations ceased, and they then acquired a more natural and fœcal appearance. I remarked in several cases, after taking two or three doses of the medicine, a peculiar irritability of the muscles of the leg, so that upon touching the sole or grasping the foot, a sudden exclamation and jerking of the extremity occurred; this was the point of nervous stimulation up to which I desired to bring the action of the remedy, and it was then discontinued altogether if reaction progressed, or given in smaller doses at longer intervals if it commenced again to decline.

Simultaneous with the dawn of reaction, weak saline solutions should be given, and beef tea, but alcoholic stimulants warily. Strict recumbency, and avoidance of exertion, are also most essential observances. As regards other medicines, I think the greatest caution is necessary in giving stimulants; for if their stimulant action be overdone, and their secondary supervene—a condition easily induced under the circumstances—disastrous consequences are insured. Opium is inadmissible; its influence is most pernicious; it has no effect on the discharges from the bowels; it delays returning secretion, and favours the production of the very symptoms we are most anxious to avert during the congestive period of reaction. Calomel is an irrational remedy; it cannot stimulate the nervous force, and therefore can be attended with no benefit to the symptoms until after reaction has occurred, when it will assist in promoting secretion, and small doses will be beneficial. Salines fail, inasmuch as their purpose is mistimed; they cannot succour the stricken nervous system, nor prevent the serous exudation from the bowels; but reaction setting in, they are of the utmost value in restoring an equilibrium of the lost material to the blood.

I append the following notes, hurriedly written down at the time, shewing the severe nature of the cases upon which the medicine was tried; they all happened at the earliest outbreak of the epidemic:—

"*Case* 1.—Private Meaney: Cholera Asiatica; collapse severe; recovery thought hopeless; strychnia in ¼-grain doses; slight effects on the spinal muscles and extremities; recovery."

This was the first case in which the medicine was administered; other remedies had been given, and the case was looked upon as hopeless. After the third dose, given every half hour, slight effects on the spinal muscles and extremities were shown; the rice-watery stools stopped; there was improvement in pulse and feature, and recovery ensued by the gradual disappearance of every bad symptom. Reaction was sustained by occasional doses of the medicine until the system appeared to be carried safely over the period of the poison's dangerous activity.

"*Case* 2.—Private Emmett: Cholera Asiatica: collapse continued and severe; strychnia in ¼-grain doses, until slight effects were visible; reaction occurred slowly; recovery."

This was a very bad case in a weakly cachectic man, who had been recently under treatment for purpura. There were slight specific effects of the strychnia displayed after four doses, given every half hour. At the same time there was a distinct improvement in the pulse; vomiting and diarrhœa ceased, and the other symptoms gradually gave way. Reaction was sustained for three days after by occasional doses of the medicine.

"*Case* 3.—Sergeant Davies: Cholera Asiatica; collapse well marked; rice-watery stools; strychnia in ¼-grain doses was given until the influence was established; reaction occurred slowly; recovery."

In this case other treatment was first tried, and the symptoms deepened; the strychnia was then commenced;—after the third dose, given every half hour, slight twiching of the flexor muscles of the fingers was perceived, and the circulation and general appearance improved; the medicine was discontinued;—*twice*, during the day, relapse threatened, and the pulse failed;—the specific action of the medicine meanwhile disappearing;—and twice the circulation, and other symptoms of reaction were again recovered, and secured by repeating the same dose of strychnia.

"*Case* 4.—Private Leech: Cholera Asiatica; collapse; strychnia in ¼-grain doses; reaction slowly occurred, afterwards complete."

Obvious amendment took place in this man when the action of the medicine on the system was shown in irritability of the feet, &c.; and the choleraic symptoms were removed;—he died, however, of consecutive fever five days after, with cerebral complication.

"*Case* 5.—Private Satcher: Cholera Asiatica; collapse urgent and deep; strychnia in ¼-grain doses; reaction after three doses was established."

In this case the rice-watery stools changed their character, and bile appeared in the discharges from the bowels, and other reactionary symptoms set in with the occurrence of slight therapeutical effects of the medicine upon the fingers, hands, and maxilliary muscles; reaction was complete; the skin warm; the pulse free; the extremities comfortable; diarrhœa slight; countenance much improved;—unfortunately during my absence in the night, this condition was not sustained by occasional doses of the remedy, and the next morning he had relapsed and died.

"*Case* 6.—Private Doody: Cholera Asiatica; rice-watery stools; failing circulation; violent cramps; strychnia in ¼-grain doses; recovery."

After two doses, the cramps ceased at once; the discharges from the bowels abated; the pulse became firm and the skin warm.

[NOTE.—These doses of strychnia are very large. Dr. Neligan states that one grain has been known to prove fatal; and Dr. Taylor is reported to have stated that half a grain will destroy the life of an adult. It will therefore be safer to commence with one-sixteenth or one-twelfth of a grain, gradually increasing the dose till its effects are produced.—T. C.]

ON THE PREMONITORY STAGE OF GRANULAR LIDS; OR THE SO-CALLED VESICULAR OR SAGO GRAIN BODIES.

By Assistant-Surgeon F. H. WELCH, 22nd Regiment.

IN June 1863 the 1st Battalion, 22nd Regiment, was carefully inspected by Dr. Adams and myself, the objects of this being to ascertain the existence or not—in the eyelids—of the so-called vesicular bodies; to note the actual condition of each man as a reference in case of an outbreak of granular ophthalmia among them (it being present at the time in at least two battalions of the garrison); to determine, if possible, should the vesicles exist, the actual conditions under which the men were living; and to endeavour to arrive at the cause or causes of their origin and development, and the relation in which they stood to granular lids. This battalion seemed somewhat favourable for such a consideration, inasmuch as it had already been three years in the island, had occupied its present quarters two years, and had been remarkably free from ophthalmia or conjunctivitis, since its arrival, the admissions under these heads being only 90, and the cases very slight. Besides this, there was no previous outbreak of granular lids to fall back upon, either as an exciting or predisposing cause should such a condition ensue, or as bearing in any manner on the vesicular bodies; and it was fairly to be supposed that any departure from the healthy state which the lids might betray was due to causes now in operation, and perhaps admitting of detection.

The quarters occupied by the battalion consisted of the barracks at Floriana, and huts in the ravelin and crown work; the relative merits of these have been fully recorded by Dr. Adams in his report for the year.

The strength of the battalion at the time was 808 men; the number inspected was 751, and of these 392, or 52·1 per cent. presented clear, undoubted evidences of the existence to a greater or less extent of vesicles in their eyelids, a perfectly healthy condition being the exception, except in No. 10 Company occupying the huts at the crown work, and amongst the married, or those living in separate quarters. Out of all those residing in the Floriana Barracks only one could be said to have had a healthy conjunctiva, and that was a drummer, No. 6 Company, who had spent the greater part of the last six months at the Sanatorium, Citta Vecchia, and then mingled freely with cases of granular lids in every stage. Amongst those occupying the huts, the proportion of healthy increased with the length of time they had been away from head-quarters, and the chances they had had of sleeping in a purer atmosphere.

On inspecting the eyes of the men before turning over the lid, in nine cases out of ten no departure from the healthy state could be seen beyond an occasional slight collection of dried secretion at the roots of the lashes, and in the severe form a somewhat increased fullness of the larger sclerotic vessels. On everting the lids, the abnormal condition, whatever its extent, was invariably found present in the lower ones; often these were implicated alone, and always presented a more advanced state than the upper, when the disease had involved these also. The affection, with only one exception (and in this case its origin was from the inner canthus and caruncula lachrymalis) commenced at the inferior part of outer canthus of lid, in the little depression formed by the external tarsal ligament and palpebral linus; and from this point it gradually involved the whole lower lid and subsequently the upper. As seen by us, the stages of the disease may be said to be three. In the first, the vesicles required very careful attention for their detection, and then they gave the appearance of small, glistening, transparent, hemispherical bodies, studding the mucous membrane and projecting above its surface; their size was that of a very small pin's head, their contents translucent and limpid; they were not acuminated like the small vesicles usually met with in some skin diseases, but looked like little tense bladders of water; and they were not usually accompanied by an increased fullness of the blood vessels in their vicinity. In the second stage, while larger in size, they differed somewhat in character, their contents were opaque, milky, and more glutinous in consistence; they did not project so much above the mucous membrane, because now this latter structure was invariably swollen and injected and so raised to their own level. In the third stage, they looked like cut globules of opaque jelly studding a red ground work; they were solid, and had increased in size so much, and so encroached on each other, as to leave only little interspaces of mucous membrane; this condition was to be seen usually at the outer canthus when the affection had involved the upper as well as the lower lid. An advance even on this was seen in two small band boys; they did not complain of any inconvenience beyond the sticking of the lids together at night; the vesicles formed an almost uniform beaded surface with very little mucous membrane between them; in fact, they could not have been distinguished from a slight case of granular lids, and only wanted a further growth and an inflammatory attack to bring them under that denomination.

The "sago grain bodies" were met with either uniformly scattered, in the form of groups, or as occupying the whole surface of the lid. In some cases the outer canthus would be completely studded, in the centre of the lid they would be pretty equably distributed, at the inner canthus, an occasional solitary one would be found, while the upper lid would exhibit little pins' points (apparently the very earliest stage,) and an hyperæmic condition of vessels. They avoided the ciliary margin on the one hand and the palpebral linus on the other, the intermediate space being their favourite site. The amount of vascularity and tumefaction of the mucous membranes varied much; the presence of hyperæmia did not appear at all necessary for their production, as in the first stage generally this was normal, and in some men with fair hair and ruddy complexions the amount of vascularity was even below that usually met with; in the second stage a valuable but increased supply of blood was always met with, and frequently accompanied by augmented mucoid secretion, and increased production of tears, gluing the lids together at night and dimming the sight.

Usually the men had nothing of which to complain, and would not admit anything wrong with their eyes. Invariably in the first stage, and often in the second, the eye appeared normal, but when much vascularity and tumefaction of mucous membranes were present, then the gluing of the lids and the watery eye were causes of discomfort; in no case was the sensation "of dust in the eye" present, and even in some of the very worst cases the symptoms were only objective, showing how quiescent the eye will be when causes of irritation are present in the lids, provided the same have been gradually produced. As a general rule the inconvenience and augmented mucus and tears followed in proportion to the hyperæmia.

Whenever one lid was undoubtedly affected, that on the opposite side would always present a like implication, thus leading to the inference that the cause was general, at least in respect to the medium of its communication.

As has before been stated 392 were affected, and in order to determine the influence which age had in rendering the men liable, the inspected as well as the affected were classed in periods of five years each, and the following results brought out.

Age.	Number Inspected.	Number Affected.	Ratio of Affected to Inspected at each Age.
Below 15	1	1	100 per cent.
From 15 to 19 inclusive ..	30	22	73·3 „
„ 20 „ 24 „ ..	280	159	56·7 „
„ 25 „ 29 „ ..	254	133	52·3 „
„ 30 „ 34 „ ..	100	45	45·0 „
„ 35 „ 39 „ ..	71	27	38·02 „
„ 40 „ 44 „ ..	14	5	35·7 „
„ 45 „ 49 „ ..	0	..	..
„ 50 „ 54 „ ..	1	..	..

This clearly shows that age exercises an all-powerful influence in rendering them susceptible to the disease, the ratio diminishing to increasing years; and is probably to be attributed to this, that those in whom the body has not arrived at its full development and its tissues consequently are in an active state, are more liable to suffer from surrounding influences than those in whom the developmental process is not superadded to nutritive action,

The proportionate severity of the affected amongst those fallen under its influence is seen below: from it we find that the greater part were only moderately affected, that is in the second stage, next in point of numbers were the severe cases, and the slight in the minority.

Severely, .. 3rd Stage	.. 94 affected ..	..	23·9 per cent.
Moderately, 2nd „	.. 251 „ ..	..	64 „
Slightly, .. 1st „	.. 47 „ ..	..	11·9 „

The influence of age over the degree of affection is shown in the following Table, those below 15 years of age and above 45 being excluded on account of their paucity.

Ages.	Severely Affected.		Moderately.		Slightly.	
	Number.	Percentage.	Number.	Percentage.	Number.	Percentage.
From 15 to 19 inclusive	12	54·5	8	36·3	2	9·0
„ 19 „ 24 „	38	23·8	109	68·5	12	7·5
„ 25 „ 29 „	30	22·5	87	65·4	16	12·0
„ 30 „ 34 „	6	13·3	29	64·4	10	22·2
„ 35 „ 39 „	6	22·2	14	51·8	7	25·9
„ 40 „ 44 „	2	40·0	3	60·0	..	..

From this it will be seen, that the proportion of the severe cases among the affected diminished with increasing age, that the second stage predominated among the medium ages, and the slightly influenced were at the maximum between 35 and 40. The same circumstances were probably in operation in varying the severity as the frequency of the disease, though why the severe cases should increase after 34 years of age seems doubtful.

The progress of the affection appears as follows:—an exciting cause acting on the minute glandular bodies of lids renders them hypertrophied; they, acting as irritants, lead to an augmented vascularity followed by an increased production of mucous membrane elements, and advancement of organization of gland contents from fluid to a tissue; gradual growth of the latter, until it assumes the firm beaded appearance of the so called granular lid.

In No. 10 Company there were some men in whom the vesicles were receding and assuming an atrophied condition, a fatty change being the medium; and in many of the older men the contents appeared to have undergone calcareous degeneration; in this case the result was as bad (if not worse) than the disease, inasmuch as tumefaction and redness of mucous membrane, constant mucoid discharge and lachrymation, were the invaluable accompanying conditions.

That these bodies by their presence neither produce an inflammatory affection, or render the men liable to it on slight causes cannot be doubted. Since the inspection, 17 cases have been admitted into hospital who were known to have vesicles. In these, the lining membrane of the lower lids, without implication of the upper, were tumefied and injected, puro-mucoid discharge, increased lachrymation, and gumming together of the lids at night accompanying it, but no feeling of dust in the eye, or sclerotic injection beyond the slightest amount. Under astringents, and a few days rest, they quickly relapsed into a quiescent state, and from what we could ascertain, the inflammatory attack did not appear to hasten the progress of the affection, but rather the contrary, the number of the vesicles seeming fewer than before as though they had burst and extended their contents. In all the onset was gradual.

In respect to the morbid anatomy and microscopical character of these bodies we know nothing, no man having died in whom they were present.

The Floriana barracks are, as has already been described in previous reports, long, oval, casemate, stone rooms, placed side by side, and communicating with each other by a large open doorway in the dividing walls. They are situated on the edge of the fortifications which form one of their boundaries, and, with this exception, are surrounded by large high buildings that effectually exclude all currents of air. They are ventilated to their utmost, and as the door on each is opposite to a windowed opening cut through the thick fortification, a chance of having a thorough draught of air in each occurs whenever the wind is in the requisite quarter; but this is seldom. These remarks hold good of all the rooms except Nos. 11 and 12, the latter being placed at a bend of the fortification, is in respect to No. 11, in the form of the letter T, the long extent of one being parallel to the short extent of the other, and so there is no possibility of having a through current in either.

The Ravelin is a higher ground than Floriana, but shut in by ramparts. It consists of large huts, with windows high over the men's heads. There is no possibility of a continuous change of pure air at night.

The Crown work is situated highest on an outshoot of the fortifications on the land side, overlooking the country, and exposed in all quarters to the breezes; it consists of small huts with large windows, and during the summer, when they were open, the men might be said to be sleeping in the open air in reference to the purity of the atmosphere they breathed.

At the time of our inspection, the companies occupying these respective barracks were as follows. The ratio of affected in each is also shown:—

Floriana ..	2, 4, 5, 6, 7, 8 Companies..	50·8 per cent. affected.
Ravelin ..	1, 3, 9 „ ..	60·2 „ „
Crown Work..	10 „ ..	36·3 „ „

Thus the buildings, by their variety of site and chances of free ventilation, offer a contrast; but this is greatly nullified by a change of the companies occupying them. Every three months, however, the Table clearly shows one fact, a great improvement of those occupying the Crown work over the rest. This company (No. 10) had already been there three months; but it had no advantages over the rest, except the site and condition of quarters with resultant circumstances, and its comparative immunity is no doubt attributable to these. The least involved of the companies at Floriana had had their turn at these quarters with the present year; the most involved had not.

Now the site of the rooms at Floriana give 733 cubic feet, and 45 feet superficial surface to each man, and for the purpose of ascertaining the impurity of the air at night breathed by the men, a few observations were taken under the following conditions:—It being the month of June, all the means by which a diffusion of the air of rooms with the external air might be guaranteed, were brought into play, the doors, windows, and ventilators open. The observations extended over three weeks, and the times chosen were immediately after getting into bed, and before rising in the morning. As the result, we find that the average temperature of these rooms was 75°, against 74° of outer air, the highest being 80°, the lowest 72°, against 85° and 64° respectively outside; the variation in any one night never exceeding 5°. At the time of going to bed, there was an average of 2° below external air, and 8° above it on rising in the morning. Taking saturation as 100, we get an average humidity of air in room, 85 (the highest being 100, and the lowest 74), against 59 of atmosphere, and an average amount of carbonic acid represented by 1·72 per 1,000. Thus, taking the carbonic acid as the standard of impurity, and 0·4 per 1,000 as the ordinary amount, we get an atmosphere for breathing four times as impure as it ought to be, and containing nearly half as much more of aqueous vapours, and this under the most favourable circumstances that the barracks will allow. These observations tend to show—1st, how little diffusion took place between the air of rooms and that outside; 2nd, a remarkable equability of temperature; 3, air impurity and moistness of the air quite astounding, a condition of atmosphere that would greatly favour the growth and production of any tissue of low organization.

At the Ravelin, where the men have 471 cubic feet, and 46 superficial feet each, the air in which they slept was, in respect to the carbonic acid and watery vapour, quite as bad; but the temperature was not so equable, and showed a greater approximation to the general atmosphere; while at the Crown work the difference was very slight, in fact, where they slept in pure air, or the nearest possible approach to it.

Taking into consideration the comparative immunity of the company sleeping in a pure atmosphere, and the improvement of the companies who had had the same advantages over those who had not, and who were now living under the same conditions, the inference is, that an impure moist air, if not the exciting cause of the disease, yet exercises an unbounded influence over its extent and severity, and that the condition of a man's lids may be taken as a good standard of the hygienic circumstances under which he is cast.

Again the worst companies were 1, 2, and 3, the proportion of these affected to healthy being in the first, 72·8 per cent., against 48·3 per cent., the average of the companies in the same barracks; and in the two latter, 75·8 per cent. against 52. Now these companies had invariably relieved each other in respect to occupying the rooms Nos. 11 and 12 at Floriana, and these rooms, as I have already said, although communicating with the rest, yet being placed at the extreme of the barracks, and a bend of the fortifications, do not allow of a through current of air, and must always be in a state of more stagnation in comparison to the other rooms. The air at the time of observation did not contain more carbonic acid than the rest, but showed an increase of 2° in humidity. The nights at the time were very still, but there can be no doubt that when, owing to a through current of air, the impurity of the rest of the rooms would be decreased, the influence on Nos. 11 and 12 would be almost *nil*.

It was frequently noticed that the sergeants and the married, although residing close to the barrack-rooms, but in separate apartments, and exposed to all the influences of the private soldier, with the exception of the vitiated atmosphere at night had perfectly healthy lids. The two most severely affected were band boys living in the general barrack-room, their parents (sergeants), with families, occupying a private quarter, but neither the parents nor their children residing with them, showed any but the slightest traces of vesicles, the major part not the least. The same may be said generally of the married and children at the Horn work. Each family has a separate apartment, and although they may shut the doors and windows at night, yet, from the state of the walls, it is impossible to exclude tolerably free ventilation; they were for the greater part free, and no case of ophthalmia (except *O. neonatorum*) has occurred among them during the summer. Again, in going over No. 10 Company, five men in succession presented themselves with lids more severe than the rest; on enquiry it was found they occupied the same hut, and always slept with the windows and doors shut.

That this condition of lids was not brought about by contagion seems clearly proven by the invariable implication of both eyes to a like extent; that it was not by infection is supported by the facts, that those who were mingling with the affected in every possible way, washing in the same bowls and water, and living under exactly the same circumstances beyond the sleeping apartments, did not suffer; and even suppose it communicated by contagion or infection, the cause of the first few cases would yet require elucidation. That it was not due to the "glare of the sun" or "dust," is clear from the very variable severity of the affection in those equally exposed to these causes, and the immunity on the part of the women and children. Dust, by its constant irritation, no doubt, may produce a roughened and injected state of the conjunctiva; but this is very dissimilar to vesicular lids; how the "glare of the sun" can affect the living membrane of the lids, and produce such a change in its tissues without implicating the other component parts of the eye, is a complete mystery, and probably will ever remain so. Certainly, mingling cases of "chronic ophthalmia," or "granular lids," with healthy men, or those suffering from other diseases, will not produce "vesicles," or even its own condition; men and boys may be for months in the same rooms, wash in the same bowls and water, and have the most free intercourse with "granular lid" patients, and yet not suffer in the least degree, provided the hygienic conditions are good. This was very well exemplified in an orphan asylum in Valetta; there were numerous cases of "granular lids" in every stage, some even having lasted three years, and yet not cured, mingling with healthy-lid boys, and although these latter worked and played with the affected, slept in the same rooms, used the same towels, bowls, and water, yet, since admission, no new cases had occurred, and no boy presented vesicles who had been in the asylum any length of time; in three cases, where more than one child had been received from the same dwelling prior to admission, while one would show "granular lids," others would merely have "vesicles." The free intercourse of the patients one with another at the Sanatarium, Citta Vecchia, and the men at St. George's Bay, during the shooting season, support the same inferences; and the experiences of the Maltese themselves clearly shows that it is not those exposed to the weather, the dust, and the glare of the sun who suffer from ophthalmia; but those shut up from day to day in the foul, close, underground cellars in which they live, the men and larger boys escaping, the women and girls, and young children showing "blear eyes" and every stage of conjunctivitis; and is it not strange, that if "granular lids" be due to dust or sun, how comes it, that out of five battalions at Malta, two should be severely affected, one slightly, and two escape, while all are constantly and equally exposed to these causes?

No doubt in this, as in most other diseases, man will find the cause, not in the conditions which Providence has imposed on him, as necessities for living, and, therefore, unavoidable, but in neglect of the ordinary rules of hygiene.

From this paper the following deductions may be drawn:—

1st. That men may be carrying about a condition of the lids far removed from the healthy state, and yet to a casual observation not detectable.

2nd. That these "vesicles," or "sago-like bodies," whatever their nature may be, are caused by, or at least intimately dependent on, the impure state of the atmosphere in which the men live.

3rd. That the condition of the lids may be taken as a standard of the hygienic condition of the regimental quarters.

4th. That age exercises a great influence on the extent and severity of the affection.

5th. That the presence of these vesicles cause or predispose to inflammatory attacks.

6th. That there is an intimate connection between "vesicular bodies" and "granular lids," the one being the primary stage of the other.

During the year 1864 fifteen fresh cases of ophthalmia occurred in the battalion, six of them following the presence of the vesicular bodies as above described, eight being cases of catarrhal ophthalmia, mostly of a severe character, and traceable to its usual causes, and one in which catarrhal ophthalmia, contracted from another man, was engrafted on highly developed "vesicular bodies," and assumed from the very first all the features of granular lids.

The barracks occupied at present (February 1865) are the same as in June 1863, with the exception of the huts at the Crown Work, but the giving up of these has led to no overcrowding of the others, inasmuch as the absence of two companies at rifle-practice during the winter, and the placing of 100 men under canvas during the summer, have given sufficient average cubic space.

An inspection of the mens' eyelids in December 1864 shows a great diminution of the number of those suffering from vesicles in comparison to the result brought out at the inspection of June 1863. Out of 670 men lately examined, 134 only were affected, giving a per centage of 20 against that of 52 previously. This is quite irrespective of the changes that have occurred in the members of the battalion, and, consequently, does not offer a fair contrast. A comparison, however, of the condition of 308 men who were previously affected, and are still in the battalion, shows this number diminished to 95, or rather more than one-third, returned to a healthy condition of the lids. The degree of severity of those now suffering follows the same ratio as the number affected, with the exception of the man mentioned above and No. 10 Company.

Further and more extended examination of the condition of the air in the barrack-rooms at night shows that the amount of deterioration, as before stated, although applicable to the breathless nights of summer does not hold good throughout the year. Numerous observations, extending over a lengthened period, give an average impurity of ·95 carbonic acid per 1,000, or rather less than two and a half times more than healthy air for the greater number of the rooms at Floriana barracks, the relative humidity remaining much the same as before stated. Also with respect to the huts at the Ravelin, the average amount of carbonic acid was ·94 per 1,000; yet this quantity, as well as the temperature and amount of aqueous vapour, varied very greatly in comparison to the relative equability of air in the Floriana Barracks. The only rooms that fully bear out the unfavourable condition of 1863 are Nos. 11 and 12. In these the average of carbonic acid was 1·5 per 1,000, and relative humidity 90.

The decrease of the prevalence of the vesicular bodies shows that the conditions under which the greater number of the men were living in June 1863, was not the cause of the affection, as supposed; and these further experiments demonstrated that, even with an atmosphere nearly two and a-half times too impure, the lids will regain their normal condition. Yet the conclusions arrived at with respect to the cause being found in the impure air, and not due to dust, climate, glare of sun, or contagion is fully supported, inasmuch as free exposure to all these influences have been well tested, and the result is as stated. Among the women and children no case of ophthalmia has occurred; and, with the exception of one or two families, which are easily accounted for, the lids are free from all disease, as stated previously.

The battalion, on entering the island in 1860, was posted at the worst barracks, and when it changed quarters to Floriana in March 1861, it was a change but one degree of improvement. Free ventilation was attempted, and in June 1863 the barrack-rooms were in as satisfactory a condition as a bomb-proof store-house could well be made. The condition of the air in these rooms is now sufficiently bad, but what it must have been prior to these improvements is somewhat difficult to imagine.

No. 10 Company was the one that, in June 1863, showed a considerable improvement over the rest, and was living under the most satisfactory conditions. Since that time this company is the only one that has occupied No. 11 and 12 Rooms at Floriana. All the other companies show a remarkable diminution in the per centage of affected, while this maintains a ratio of 33 against 36 per cent. formerly. This, however, is too low an average, inasmuch as eight men who were effected, having left the battalion, are not included. This would increase the per-centage to 45, and give an advance of 9· over its former state. The extent of severity in this company was also augmented, and out of sixteen men who now have "vesicles," and in whom they were formerly absent, eleven belong to No. 10.

This gives a striking instance of the influence of impure air in producing sago-grain bodies. Formerly, in No. 10, all the cases were slight, and it was noticed that many were receding; now the greater number of cases are severe, and fresh ones have occurred. The only condition in which the company differs from the others being the occupying 11 and 12 Rooms, and, consequently, sleeping in a very deteriorated moist atmosphere.

All other observations gleaned in this or other battalions support the former conclusions, and point to bad hygiene as the cause of the affection, and the development of the affection into one of the forms of granular lids.

ON THE PROBABLE SURGICAL EFFECTS IN BATTLE IN CASE OF THE EMPLOYMENT OF PROJECTILES OF A MORE ELONGATED FORM, SUCH AS THE WHITWORTH PROJECTILES.

By Deputy Inspector-General Thomas Longmore, Professor of Military Surgery, Army Medical School.

General Remarks.

Certain features in the wounds produced by cylindro-conoidal projectiles present marked differences, when compared with those produced by spherical projectiles, under the ordinary circumstances of warfare. The larger proportionate number of wounds where the great cavities of the body are opened; the greater number of injuries to the vital organs; the more extensively destructive and fatal effects in wounds of bones, which now occur in engagements where cylindro-conoidal bullets are employed, than were met with formerly when the spherical balls were used; the more extensive laceration of the soft structures owing, not only to the greater destructive power of cylindro-conoidal projectiles and more violent dispersion of the substances struck by them in their flight, such as fragments of bones, but possibly also to the circumstance of their being able to be deflected into a partial rotation on some of their shorter axes, and thus to inflict in their passage through the soft tissues of the body wider spheres of destruction than the sperical bullets, which, from their form, could only present one equal length of diameter in whatever direction they might travel; these are facts which have now become well established by military surgeons.

The following question is now raised:—What will be the probable surgical effects if a still more elongated projectile, such as the Whitworth rifle projectile, be employed?*

It may simplify the means of replying to this question, if I first recapitulate what appear to be those conditions, attached to elongated projectiles in general which influence their power of wounding the human body, and modify the wounds they inflict.†

These conditions are—

(*a*) Degree of Velocity.
(*b*) Form of Apex.
(*c*) Diameter.
(*d*) Length.
(*e*) Hardness.
(*f*) Weight.

The degree of velocity (*a*), form of apex (*b*), and diameter (*c*), chiefly influence penetration. The greater the velocity at the moment of impact, the more pointed the apex of the projectile, and the narrower its diameter, the greater the ease with which the highly elastic skin is perforated, and the inner structures traversed.

As length (*d*) is increased, so will liability to more extensive laceration of the tissues through which a projectile passes be increased. It is evident that when a cylindro-conoidal projectile, as it ordinarily flies, rotating on its long axis, is suddenly brought into direct opposition and collision with an unyielding substance, whether before or after entering the body, one of three events will occur. *Firstly*, it may perforate the opposing substance and pass on, retaining its original line of flight; *Secondly*, its progress may be arrested, being itself crushed and flattened, or separated into two or more portions; or *Thirdly*, it may be caused to pursue its course in a new direction. In this last case, when deflected, its line of flight may be simply altered, its original course of rotation and width of track being preserved: or, its rotation being checked, it may effect an opening for itself sideways, that is, with its long axis at right angles to the line of its course: or the rotation on its long axis may be changed, by the resistance it has met with at its apex, into a partial rotation on one of the short axes.‡ If this secondarily acquired rotation were to continue for any distance through the body, then the track of the projectile would be rendered equal in diameter to the diameter of a circle of which the *radius* corresponded in length with that of the long axis of the elongated projectiles. This altered rotatory movement of the projectile must be attended with great stretching and tearing of the tissues which immediately surround the tunnelled opening made by the projectile in its passage, and alone can explain the wide laceration met with in the course of some flesh wounds in which the entrance opening corresponds closely in size with a section of the projectile through one of its short axes. Hence the important influence of length.

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* These remarks were written in the year 1862, on two rifle bullets of the Enfield and Whitworth forms being sent to the writer with this query.

† It has been convenient, for the purposes of this paper, to analyze these conditions separately. It seems almost needless to add that the *combined* effects of these conditions would have to be specially calculated. Thus the destructive power from velocity and weight, *i.e.*, momentum, would not be a matter of simple addition, but would have to be calculated by the multiplication of the one condition into the other. The weights of the projectiles referred to in this paper are alike. The ordinary conditions of battle are also only kept in view; were it otherwise, the well-known greater initial volocity of a spherical projectile within a limited number of yards would change many of the conclusions arrived at.

‡ The frequency with which the *base* of a lodged cylindro-conoidal bullet is presented to the surgeon who has to excise it from the side of a limb opposite to that at which it has entered, is due to this secondarily-acquired rotation on a short axis.

As hardness (*e*) is increased, in addition to the qualities just mentioned, the greater will be the ease with which the metallic parts of accoutrements, the stronger bones of the extremities, and the vault of the cranium are perforated.

Finally, in addition to the above, as weight (*f*) is increased, so the degree and extent of destruction of the harder structures will be increased.

The primary rotatory motion of rifled projectiles also has an influence on the wounds produced by them, but generally not in any important degree when their original lines of flight and courses of rotation on their long axes are retained throughout their whole course.*

The *number of wounds* in battle will mainly be determined by, *Firstly*, extent of range, and *Secondly*, lowness of trajectory. In the case of two opposing forces armed with cylindro-conoidal projectiles, that force which is armed with the weapon of greatest extent of range combined with the lowest trajectory, *cæteris paribus*, will obviously, so far as small arms are concerned, have the opportunity of inflicting the greatest number of wounds.

Comparison between the probable Surgical Effects of the Whitworth and Enfield Projectiles in War.

I applied for information on the following points to the School of Musketry at Hythe.

1st. The velocity of the Whitworth rifle ball as compared with the Enfield rifle ball; the conditions as to weight, charge of powder, &c., being equal.

2nd. The hardness of each projectile.

3rd. The exact measurement of each projectile, as to diameter and length.

4th. Which projectile has the more pointed apex.

5th. Which projectile travels in the lowest trajectory.

I have now received replies to these queries from Captain McKay, Deputy Assistant Adjutant-General, dated Hythe, 24th December, 1862.

From these replies I learn that experiments have been made with the two forms of the Whitworth projectiles, viz:—the cylindro-conoidal and the hexagono-conoidal, and that a comparison between, firstly, the Enfield and Whitworth *cylindro-conoidal* projectiles, as to the points above named, gives the following results.

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* The influence of rotation on the long axis may be chiefly observed when the apex of a rifle-bullet comes into collision with the sharp edge of a thin bone, as, for example, with the edge of a broken bone of the cranium, and the bullet is partly bisected by its own inherent *vis a tergo*, or forward motion. In such a case, the divided surfaces of the lead are usually strongly marked by ridge and furrow lines, caused by the irregularly jagged edge of the broken bone by which the division has been effected; and the direction of these lines will frequently serve to illustrate the twisting force—resulting from the rotation of the projectile on its long axis—which has been at the same time exerted. There is a very interesting specimen of a bullet in the museum of the Army Medical Department, connected with a wound of the head, which exhibits nearly one complete turn on its long axis after it had been thus caught. This bullet, a Russian conical rifle-bullet, has been separated by an oblique division from the apex to the base; and the two divided parts are only held together by a narrow isthmus of lead at one of the angles of the base of the section. This isthmus is twisted round on itself, like a piece of cord, carrying with it the thinner section of the projectile, or that section which was most easily acted upon by the twisting force. The ridge and furrow lines on the separated surfaces of the bullet are contorted from the right to the left, indicating the direction towards which the *rotatory force* has modified the direction of the *bisecting force*. I am not aware that any observation of such a demonstration of the influence of the spinning quality of a rifle-bullet in motion has been before published. Although when the spinning force is first impressed upon the projectile, it is limited by the degree of spirality of the grooves of the musket to one turn in a distance, varying from 20 inches to 78 inches, according to the rifle used, yet there seems to be reason for believing that the degree of turn, or the distance within which a complete spin takes place, constantly lessens from the time the projectile quits the muzzle of the musket, owing to the greater opposition to the forward motion than to the spinning motion in its passage through the air. At any rate, when the forward motion is stopped, or nearly stopped, by a substance capable of opposing sufficient resistance, the shortened turn is in certain cases rendered obvious to sight, and it is under such circumstances that the fact is of importance to surgeons.

1st. The velocity of the Whitworth rifle ball, under the conditions named, exceeds that of the Enfield, at a distance of 800 yards, in the ratio of 6 to 4, taking penetration as a test of velocity. Its range, or area of destructive power, is therefore increased; the increase being in proportion to the increase in velocity. Its destructive power on meeting opposition is increased. This power will exceed that of the Enfield as the ratios of the squares of their respective velocities exceed each other.

2nd. The hardness of the two are alike, both being made of lead only.

3rd. The measurements are:—

Enfield cylindro-conoidal, length 1·15 inch, diameter ·55 inch.
Whitworth cylindro-conoidal, length 1·460 inch, diameter ·412 inch.

4th. The Whitworth has the more pointed apex, in consequence of its reduced diameter.

5th. The Whitworth projectile has the flatter trajectory, especially at long distances.

Taking these data as a basis, it follows, as a necessary consequence, in accordance with what I stated to be the conditions in projectiles which chiefly influence their power of wounding the human body, that—

1stly. The Whitworth cylindro-conoidal ball would be calculated to inflict more wounds when directed against a given body of troops than the Enfield cylindro-conoidal projectiles; and—

2ndly. That the Whitworth cylindro-conoidal ball would afford the opportunity of inflicting a greater number of wounds over an extended field of battle than the Enfield cylindro-conoidal ball.

Next, as regards comparison between the Whitworth *hexagono-conoidal* projectile and the Whitworth *cylindro-conoidal* projectile, I am informed by Captain McKay that the hexagono-conoidal projectile has one-tenth of tin in its composition; that its hardness and power of penetration are thereby rendered greater; that its diameter is greater by reason of the projecting angles, and that its trajectory is still flatter than the Whitworth cylindro-conoidal projectile.

With these data as a basis, therefore, it will follow that the conclusions arrived at respecting the power of wounding, and probable number of wounds, from the action of Whitworth cylindro-conoidal bullets, as compared with the action of Enfield rifle bullets, will hold good in a stronger degree if the Whitworth hexagono-conoidal be compared with the Enfield cylindro-conoidal projectiles.

The hardness and flatter trajectory are the chief ingredients in effecting this increase, not the difference in form: the softer cylindro-conoidal Whitworth projectile is hexagono-conoidal when it leaves the rifle, and, if not altered by accident, is also so at the time of striking the body.

The initial power of penetration of this hardened projectile is stated to be as 35 to 12, compared with that of the Enfield projectile. In other words, if at a distance of 50 yards the Enfield ball would go through two men at the same distance, *cæteris paribus*, the Whitworth would pass through six men.

Remarks on the probable efficiency of the Prolonged Whitworth Projectiles as regards the severity of Wounds inflicted by them.

It is understood that the purpose of a military commander in war is, not to destroy as many lives as possible, but to render as many opponents as he can hors de combat. He does not require the "stopping" quality in a projectile, which the sportsman wants in chasing swift animals, or those of a savage kind that might prove dangerous if not stopped or killed; if he did he could have many better projectiles for his purpose than the prolonged cylindro-conoidal rifle bullets. His object is merely to inflict as great a number of wounds as possible, which wounds shall disable the subjects of them for at least the campaign then in progress.

I have already enumerated the qualities required in projectiles to enable them to effect this object, so far as *number of wounds* is concerned, and expressed my opinion that the Whitworth prolonged projectiles possess the qualities in a high degree compared with other projectiles.

I will now briefly consider the character and *probable severity* of the wounds they will inflict.

It will be convenient, in estimating the probable severity of the wounds which would result from the use of the Whitworth projectiles (and for all practical purposes, the two forms of projectiles may be spoken of together) to divide the parts of the body exposed to their fire, into the head and trunk, and the upper and lower extremities.

The head and trunk may be spoken of together. The increased velocity of the Whitworth projectiles increases their power of penetration proportionably with the square of that velocity. This accelerated force, combined with their form, will cause them to penetrate, or perforate, these parts of the body even more frequently than the Enfield cylindro-conoidal bullets, or, in other words, course round, glance off, or become arrested in their progress, by the outer walls of their cavities less frequently; and, with exceedingly few exceptions, such wounds must be fatal in their results. The difference in the diameters of the projectiles will not affect the issues of such wounds: if the head or trunk be penetrated by either projectile it will not matter whether it is half an inch or four-tenths of an inch in diameter. We may therefore expect that the use of the Whitworth projectiles would lead to a greater number of fatal wounds of the head, chest, and abdomen, in war.

The upper and lower extremities may be considered together, so far as *flesh* wounds are concerned. The same causes which have been supposed to lead to a greater proportion of penetrating wounds in the head and trunk, act in producing a greater number of direct perforating flesh wounds. These, as a general rule, when the projectiles causing them had preserved their original course of rotation, would perhaps be less serious, because less tedious in their consequences, than flesh wounds in which the projectiles from diminished velocity had pursued a more indirect and devious course after entering a limb. But the average length of time for the cure of such a wound, even when no nerves or other important structures had been involved in the injury, would be seven or eight weeks, and for this period the soldier would be removed from active service. As regards the special condition before mentioned of the original line of rotation on the long axis being changed into a partial rotation on one of the short axes, the greater amount of destruction might be looked for, *cæteris paribus*, from the mixed tin and lead projectiles; because, from their hardness, such projectiles would be less likely to be flattened on meeting with bones, and they would therefore, after striking them, preserve their full length in their continued rotating course through the soft tissues.

In considering the upper and lower extremities, so far as injuries to their *bones* are concerned, wounds of the thigh, leg, and foot, are so much more serious than those of the arm and hand, that they can hardly be considered together. But, speaking generally, the qualities of the Whitworth projectiles already mentioned might be expected to lead to a greater number of fractures of the bones. Whether there would be the same amount of dangerous splintering of bones with the prolonged projectiles as with the Enfield cylindro-conoidal, can hardly be decided without practical experiment; but this appears to be more a matter of professional interest, as far as surgical treatment is concerned, for any kind of gunshot fracture of bone will answer the military object of disabling the wounded soldier for several months, if not altogether, for further service.

The general conclusion is, therefore, if elongated projectiles, such as the Whitworth projectiles, were substituted for the Enfield projectiles in war, that,—

1stly. The number of head and trunk wounds would be greatly increased; the amount of increase being proportionate to the greater velocity and lower trajectory of the Whitworth *cylindro-conoidal*, and to the greater velocity, lower trajectory, and greater hardness of the Whitworth *hexagono-conoidal* projectile.

2ndly. That of these wounds a greater proportion than now usually happens in war would be attended with fatal results on the field of battle.

3rdly. That there would also be, in like proportion, a greater number of fractures of bones, as well as of flesh wounds of the extremities, but the comparative degree of severity of these can hardly be stated without further experience.

REPORT ON THE FITNESS FOR USE IN THE BRITISH SERVICE OF A WHEELED AMBULANCE TRANSPORT CONVEYANCE

moved by hand labour (Neuss'sche zweiräderige Bahre), the employment of which is stated to have been attended with special advantages during the recent war between Germany and Denmark in Schleswig-Holstein; together with a history of the class of conveyances to which it belongs, so far as regards their connexion with the objects of ambulance transport.

By Deputy Inspector-General T. Longmore, Pofessor of Military Surgery at the Army Medical School.

Conveyances intended to be wheeled by men, known under the name of wheel-barrows, or hand-wheel litters, form a class of conveyances which has seldom been had recourse to for the systematic removal of sick and wounded of armies in time of war. The advantages of wheeled carriages moved by hand-labour for field service have not unfrequently been discussed of late years, but they have been very differently estimated: by some they have been unreservedly condemned, while by others they have been strongly advocated as a serviceable and economical form of sick transport. These opinions have, however, been put forward without much practical experience of their qualities or suitableness for use in campaigning. Vehicles of this kind have been used from time to time under casual circumstances where other transport was not available, or where they formed an ordinary method of carriage of the country, owing to local peculiarities of ground; they have been even constructed and despatched for use in the field on a special service in which the British Army was engaged, viz., in 1860; but it has only been very lately, during the late Schleswig-Holstein war of 1864, that hand-wheel carriages, specially constructed for carrying wounded, have been practically tested in active warfare. The experience gained in this latter campaign has led to the expression of such very strong opinions in favour of these particular carriages by eminent surgeons who regard their introduction as likely to form a new era in the arrangements of ambulance transport, that it seems desirable to enquire very particularly into the nature of their merits and comparative advantages as regards other more ordinary forms of conveyance.

The principal objects intended to be obtained by the construction of these hand-wheel litters are:—First, a more rapid removal of the wounded from the scene of conflict to the rear than can be obtained by the use of ordinary stretchers; Second, to compensate for the deficiency in the number of bearers usually available for transporting the wounded by lessening the fatiguing nature of the work; and Third, to avoid the necessity for increasing the number of animals employed in bearing cacolets and litières for transport service. They are not usually advocated for adoption with the view of using them as substitutes for ambulance carts or wagons on long journeys, as in transporting wounded from the field hospitals to general hospitals at a distance in rear, although they can be employed to supplement these more bulky and substantial conveyances, when necessary, even for this service; but they are recommended in preference to other conveyances for travelling over the spaces comprehended between the ground on which the wounded have fallen, or between the immediate rear of the spot where the fighting is in progress, and the first and second lines of surgical assistance.

The first object, rapidity of removal, is gained by the use of wheels, generally high wheels, by means of which the conveyance can be caused, at the cost of slight expenditure of labour, to pass speedily over rough fields as well as over regular roads; at the same time that the whole litter is made so light that if great obstructions are met with, such as interfere with the employment of the wheels, it can then be readily carried by a couple of bearers over them.

The second object is also gained by the wheeled construction of the litter. Experience has always shown, in cases of engagements attended with many wounded, that the number of bearers falls far short of the number required for the regular and rapid removal of the sufferers. This deficiency is made the more manifest by the length of time occupied by the bearers in the removal of a single man on a stretcher, if the distance from the field to the first line of surgical assistance be considerable. Under these circumstances the two bearers, especially if the wounded soldier whom they are carrying is heavy, have either to halt and deposit the stretcher on the ground while they temporarily rest themselves, or have to be relieved for a certain distance by two other bearers. The fatigue of the usual limited number of bearers is also increased by the continuous nature of their work of repeated journeys without cessation for transporting the wounded between the field and the field-dressing stations, since so long as any wounded remain on the ground they cannot be allowed to stop from their duties for repose. The plan of the hand-wheel litter obviates in a great degree these sources of fatigue by the weight of the conveyance being transmitted through the medium of the wheels to the surface of the ground, instead of through the medium of the bearers; and at the same time by the circumstance that the slight effort which is required to set it in motion on ordinary ground can be varied either by the act of pushing, or by that of drawing the machine. One attendant is sufficient for the transportation of a patient lying on a well-made wheeled litter if the ground be favourable; and the rapidity with which it can be made to perform the transport from the field of action to the ambulance is still further calculated to lesson the evil arising from a deficiency in the number of hospital bearers, by the quickness of its return for the removal of other wounded who are requiring assistance.

The third object is also important. The disadvantages attending the collection of a large number of transport animals are sufficiently obvious, not only as regards the rations consumed by them, and the attendants required for their constant care, but also on account of the unhygienic condition which they tend to increase among bodies of troops. If, therefore, a litter can be fashioned calculated to lessen the necessity for employing a large number of transport animals, and there be no important objections to it in other respects, an undoubted improvement is effected in the system of ambulance transport.

But it remains a question for consideration, although the three objects above mentioned be successfuly attained, whether conveyances wheeled by men are suitable in other respects for field service; at any rate, in such field service as British troops are likely to be engaged in. Considerations of cost, durability, portability, liability to injury, and capability of repair, arise on attempting to decide the question of general fitness of such conveyances for use in the British service.

Before entering upon these questions, and before describing the particular hand-wheel litters used during the late German-Danish war, it will be useful to refer to the several examples of this class of conveyances which have either been used, or proposed for use, at various periods. I will refer to them in the order in which they have been successively brought to notice.

Bautzen Wheel-Barrows. (*Brouettes.*)—Baron Larrey mentions in his account of the Russian campaign,[*] that after the battle of Bautzen, in Saxony, which was fought in the summer of 1813, two-thirds of the wounded were transported to Dresden by the inhabitants, at his suggestion and advice, in a very convenient kind of wheel-barrow which was in general use in that country for carrying provisions and merchandise. Every private person had several of these vehicles. All the road from Bautzen to Dresden, distant about 30 miles, had more or less inclination, so that the movement of these barrows met with no obstacle on this occasion. Baron Larrey relates that he had seen as many as 150 filing along the road, one after another; and that, from observation of them, he was convinced no kind of transport could be more favourable or more expeditious for the country. I am informed that these barrows, which are in general use in the south of Germany, are usually so curved and inclined that a person lying upon one of them would find his position very much more easy than he would upon another of which the floor was straight, as happens generally in English wheel-barrows, which require to be tilted up considerably when put in motion. They are lower, and are also much longer than these latter,

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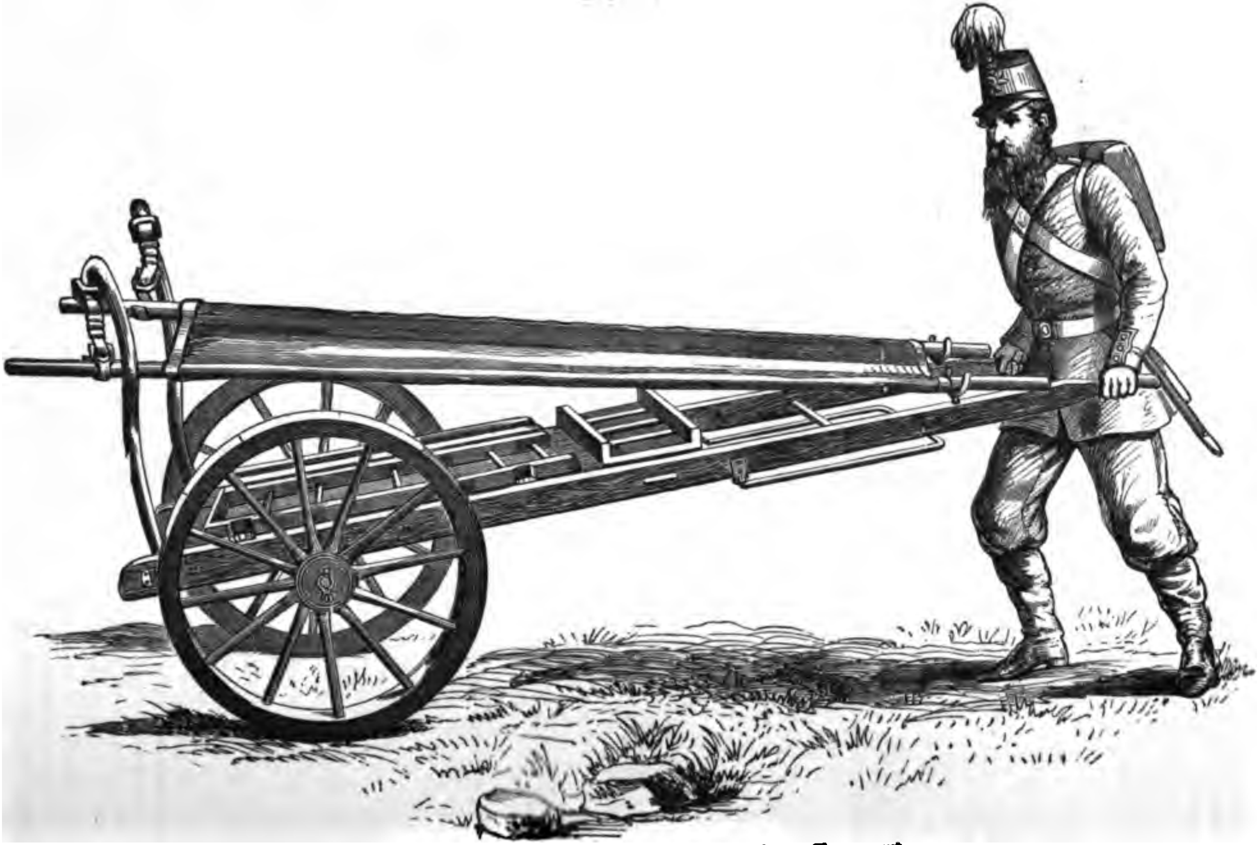
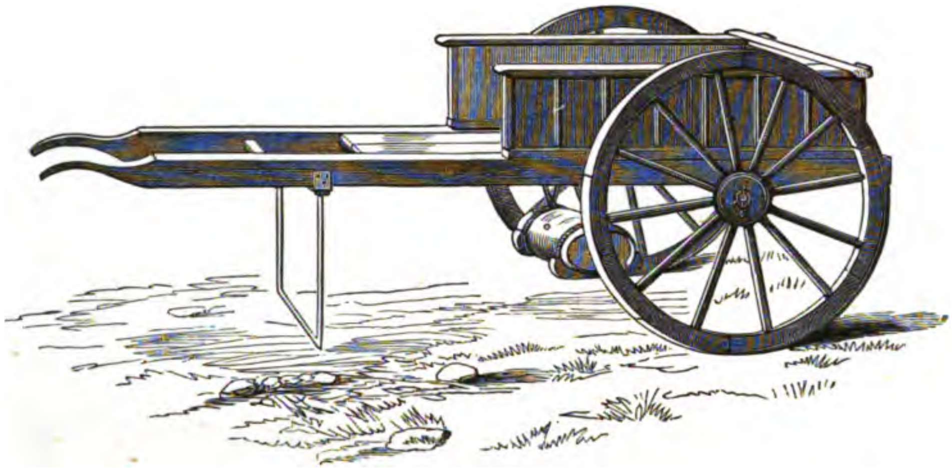
[*] Mémoires de Chirurgie Militaire et Campagnes du Baron D. J. Larrey, Paris, 1817, tom. iv. p. 168.

No. 3.



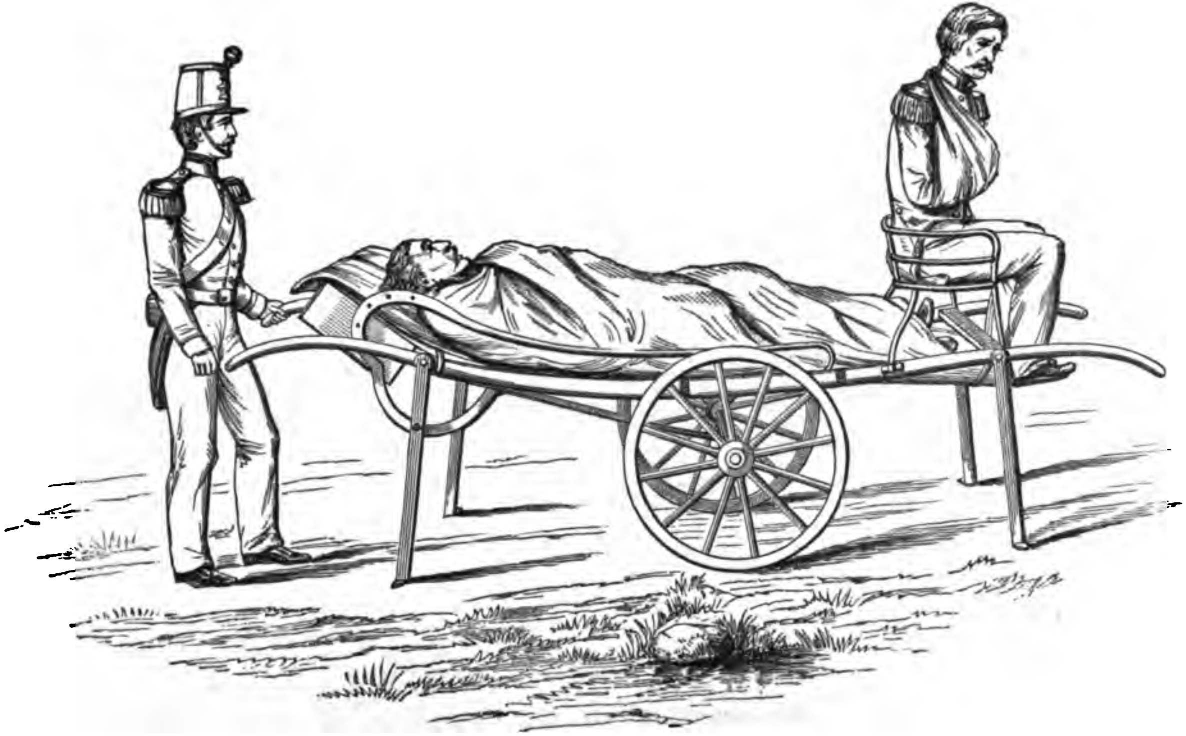
The China Hand-barrow, arranged for Ambulance Transport.

No. 2.



The China Hand-barrow, arranged as a Commissariat Store-cart.

No. 1.



Evans's Hand-Wheel Litter.

being readily able to sustain a person lying at full length, with the head and shoulders slightly raised. There is only one wheel, but this is broad, and from the general width and construction of the barrow, together with the aid of two short supports near the forepart of the conveyance, they are with difficulty overturned. It is, moreover, a light vehicle, and is not fitted with sides above the shafts, so that wounded or weak persons can be readily laid upon or removed from it. It is frequently in use in this part of Germany for the removal of persons who have met with accidents in civil life.

Evans' Hand-Wheel Litter.—During the period of the Crimean War, in February, 1855, a surgeon in practice in London, Mr. G. Evans, published an account of a hand-wheel litter which he had planned as a subsidiary appliance or addition to the ordinary means for the conveyance of wounded from a field of battle. It was designed so as to be capable of carrying either one or two wounded men, one being in a recumbent, the other in a sitting position, and could be wheeled by one, or carried by two bearers, according to circumstances. As this litter is made on the same principles, and seems to possess several of the essential advantages of the Prussian two-wheeled hand-litter, which, according to the published reports, was found so effective at the recent attack on the Forts of Düppel and on other occasions, I append a drawing of it, and make a quotation of some of the uses for which its inventor constructed it to be suited. The drawing will sufficiently explain the nature of its contruction without further description.

The conveyance represented (see sketch No. 1) was planned, according to its designer, to combine the following advantages:—

(*a*) Where the ground is favourable, two wounded men, with their arms, can be removed on it by one man.

(*b*) Where the ground is too rough for the wheels to be used, it can be carried so loaded, by two men as an ordinary litter.

(*c*) The back can be raised or lowered, to give the recumbent patient whatever degree of inclination the nature of his wound makes desirable.

(*d*) The back at the same time forms a commodious canteen, under lock and key, for the following important medical and surgical necessaries: canteen of water, canteen of brandy, a drinking cup, field tourniquets, lint and tow, plaister and bandages, sponges, set of metal splints, paddings and tapes, a hand lantern, can of oil and cotton, &c., and lucifer matches. In addition, one or more pairs of crutches can be slung underneath the litter.

(*e*) The litter can also be used in the field as an operating table; and the chair removed from the litter, can be used for operations in the upper extremities.

(*f*) After the wounded are removed, these litters can be usefully employed in collecting muskets, accoutrements, &c., scattered about the field.

(*g*) The wheels being removed, this litter forms an excellent bedstead for the hospital; where the chair will be scarcely less useful to the wounded.

(*h*) Any number of them attached to a regiment can be made most useful when not needed for field or hospital purposes, in removing provisions, stores, clean or foul linen, from one point to another.

(*i.*) The litter can be made with shafts sufficiently long to admit of a mule drawing it, either with wounded on it or loaded with five or six cwt. of stores; or so loaded, it can be attached to the rear of a baggage waggon on a line of march.

(*k*) Though weighing, with its wheels and springs, only about 80 lbs., this litter is nevertheless remarkably strong in its construction; and by simply unscrewing the springs and wheels it becomes capable of easy and close stowage on board ship, and is as promptly put together again, immediately it is landed.

In April 1855, the litter thus described was examined by a Board of Army Medical Officers in London. Their report was unfavourable to its introduction into the military service. The weight was considered to be too great for the conveyance to be conveniently drawn by manual labour with the aid of its wheels, or to be carried, when divested of them, in the way that the ordinary stretcher is carried. I have not myself had the opportunity of seeing one of these litters.

Ordnance Ambulance Barrows.—In October 1856, two forms of ambulance barrows, one barrow having only one wheel, the other being two-wheeled, were sent from the War Department for examination and report by a Committee of Military Medical Officers. Neither of these barrows were approved of for field purposes. The special reasons for which these conveyances were condemned by the Committee are not stated in their proceedings, but the general principles of all such conveyances were disapproved of by these officers, so that they were induced to remark that "no hand carriage with wheels is adapted to field service."

China Ambulance Barrows.—In the year 1860 a considerable number of ambulance barrows, with two wheels, were despatched from this country to assist in meeting the requirements of the British forces then assembling in China. These conveyances have been since generally spoken of as "China barrows." When, in consequence of the disastrous affair which occurred at the mouth of the Peiho River in the summer of 1859, it was determined to force a way to Pekin, it was found that the nature of the country, and the means of transport that could be obtained on the route from the place of landing to the Chinese capital, could not be ascertained with any degree of certainty. The immense distance of the scene of hostilities from England precluded many arrangements from being made that might otherwise have been resorted to. The state of the roads that would have to be travelled over was unknown, and it seemed not impossible that all the ordinary transport animals of the country would be removed by the Chinese. It was determined, therefore, to send means of sick-carriage adapted for meeting every kind of emergency. Improved ambulance carts, as well as litières and cacolets, were provided in case horse or mule labour might prove to be available; in addition to the ordinary stretchers, dhoolies were sent on from India for native bearers; and the barrow, which is now under consideration, was also forwarded under the idea that it might be advantageously employed, both for commissariat and ambulance purposes, with the aid of Chinese labourers collected in the lower provinces. The extensive and easy means of river carriage which were found, however, to exist almost up to the walls of Pekin, obviated the need of using these conveyances, and, among other circumstances, prevented the opportunity from being afforded of testing practically the utility of the hand-barrows for ambulance transport.

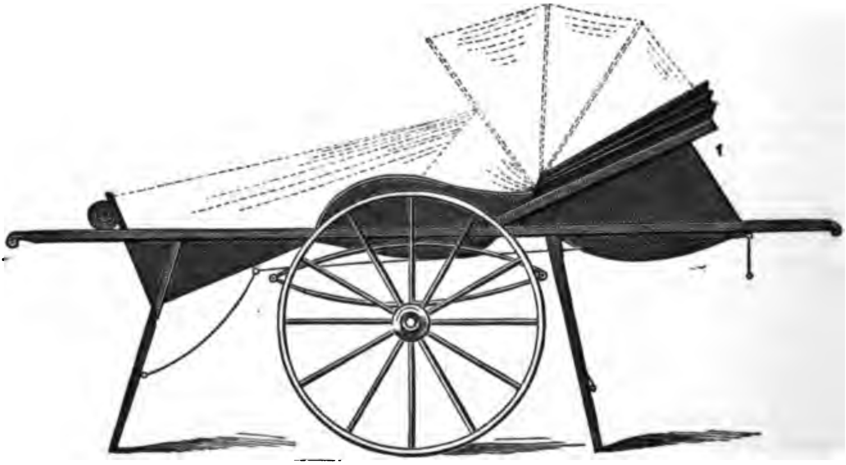
The China ambulance barrow (sketch No. 2) has the general appearance of a small cart open in front, but closed at the sides and behind. In this state it forms a suitable cart for the conveyance of stores or provisions from the rear to the front, being capable of being drawn by a single man or small horse, placed between the shafts.

When about to be arranged for ambulance purposes, a change in the arrangement of the cart has to be made. The hind board is first taken out, and the two sides, which are hinged, and of a height exactly to meet each other when lowered, are then made to fold down on the body of the cart. The hind board is next laid across in front and secured. Two iron uprights, each fitted at its upper extremity with a strong india-rubber spring and broad hook, are now inserted in iron collars, one at each side near the hind part of the body of the cart. The hooks connected with the springs are for the purpose of receiving and supporting the ends of the two poles of a regulation stretcher; the other ends of the poles of the stretcher are supported by two iron crutches which are made to screw into the shafts of the cart near their handles. If a bearer now places himself between the shafts, he can lay hold both of the shafts and of the ends of the stretcher poles; and when the shafts are raised to a convenient height for the man to draw the cart, the stretcher is brought into a horizontal position clear of contact with the wheels, or any other part of the barrow. The stretcher could not be used without the sides of the barrow being turned down, because, if they were left upright, the poles of the stretcher would be brought into contact with them. (See drawing No. 3.)

The transport is rendered easy to the patient by the action of the springs which assist in supporting the stretcher upon which he is lying. Ropes are supplied with means of hooking them to projections from the axles, for attaching an additional bearer to add to the traction, if necessary, as in ascending a steep slope. A keg for water is suspended from the under part of the barrow.

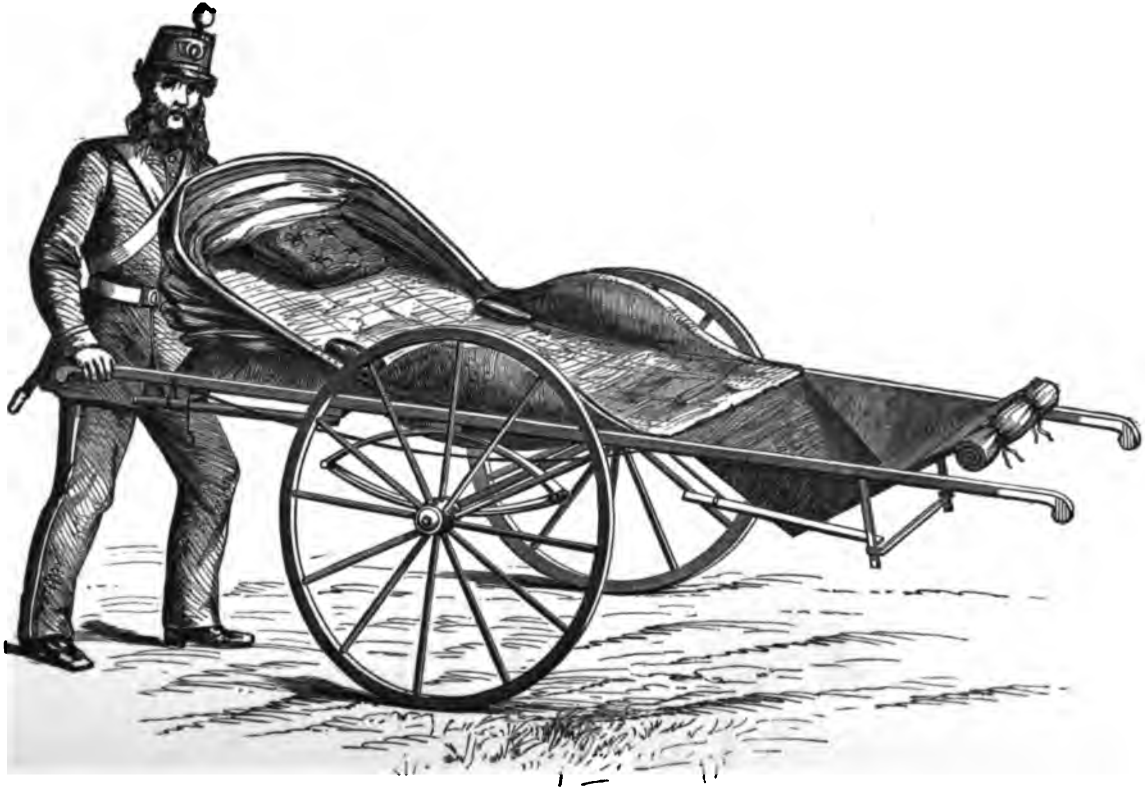
A pattern of the China barrow, complete for ambulance purposes, including the stretcher, has been carefully weighed at Netley. The weight was found to be 234 lbs. 9 oz.

No. 7.



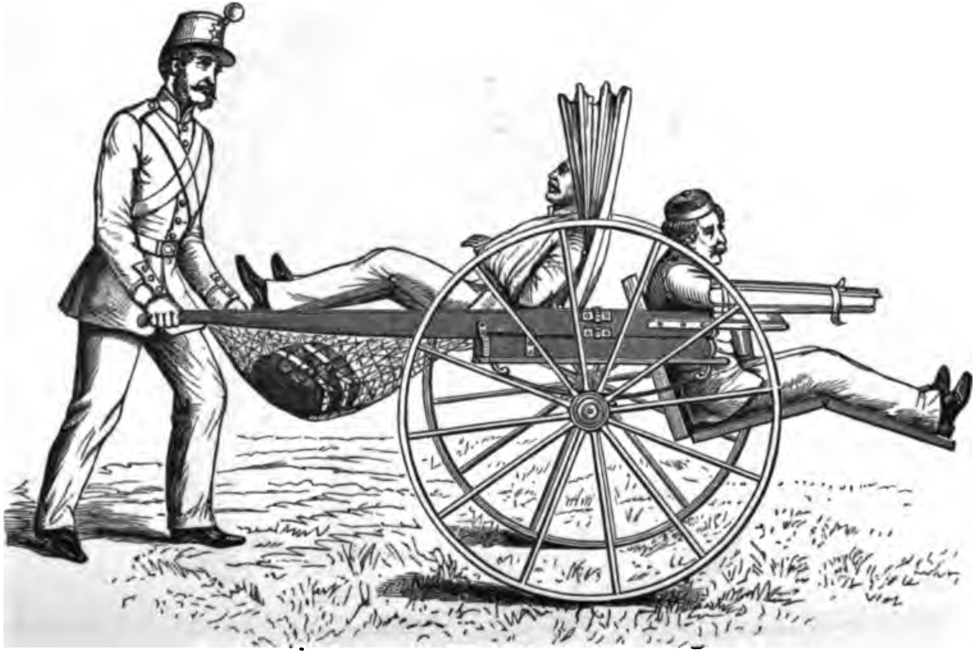
Side view of Neuss's Two-wheeled Litter. (Scale of ½ inch to 1 foot.) Copied from Dr. Gurlt's pamphlet before quoted. The dotted lines indicate the manner in which the sailcloth hood and cover are used when required to protect a patient from rain or sun.

No. 6.



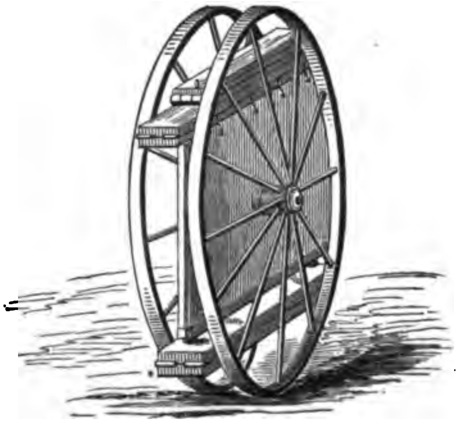
Neuss's Two-wheeled Litter, as seen in perspective. (From a drawing by Assistant-Surgeon H. C. Gillespie of the litter at the Royal Victoria Hospital.)

No. 4.



Neudörfer's Two-wheeled Litter, for the transport of one, or two, wounded soldiers.

5.



Neudörfer's Litter folded up and packed for carriage.

Neudörfer's Hand-wheel Litter.—Early in the year 1864, before the war with Denmark commenced, Dr. J. Neudörfer, an Austrian military surgeon, and Professor of Surgery in the University of Prague, published the first part of a handbook on military surgery.[*] Dr. Neudörfer had acted as Principal Medical Officer of the ambulance of the 8th Corps d'Armée of Austrian Infantry during the Italian campaign of 1859, and at the close of the war had been placed in charge of a division of the Military Hospital at Verona. He had thus been able to gain considerable experience in all matters relating to wounded in time of war. Dr. Neudörfer, from this experience, was led to object to all the existing forms of litters, both to those borne by bearers, and to those on the backs of animals, as well as to all the ordinary forms of ambulance waggons. He defined the following to be the requisites for a transport vehicle, suitable for field purposes:—1st. That it should not require to be drawn, or to be carried by any animal. 2nd. That it should be capable of being managed and drawn by *one* man. 3rd. That it should be as competent to travel over fields and rough places as over regularly made roads. And 4th. That it should be strong, light, durable, cheap, and portable. These conditions, he thought, would be fulfilled by a litter, or handbearer, on a two-wheeled frame or car of iron, very light, and with *large* wheels.

Carriages on the principles thus enunciated by Dr. Neudörfer were constructed by Messrs. Fischer, of Heidelberg. These conveyances have been made capable of transporting either one wounded soldier or two at the same time.

The following is a short description of one of these litters:—The two wheels are each about four feet in diameter. The framework, which is supported on springs between the wheels, admits of adjustment, so that a wounded person can be placed in any desired position, recumbent, sitting, or half-sitting, and half-reclining. When two patients are carried, they recline back to back. Beneath the litter there is a netting, within which a knapsack or surgical materials can be carried, and means are also provided for carrying one or two muskets. In Dr. Neudörfer's hand-wheel litter, the stretcher, or canvass frame, upon which the patient rests, is removed from the machine and laid on the ground when a patient is about to be placed upon it; and it is said that the stretcher can be readily replaced in its former position with the patient upon it. The conveyance can be taken to pieces for packing, and by the stretcher portions being folded up and placed between the two wheels, which are then brought near to each other, the whole machine can be reduced to occupy a space having its sides equal in length to the circumference of the wheels, by seven inches in width. I am not aware that any conveyances, made precisely in accordance with the description above given, have been actually used in military service, neither have I myself had the opportunity of examining them.[†]

The illustrations numbered 4 and 5 have been copied from photographs, furnished by Messrs. Fischer, of some of these carriages, which they have manufactured in accordance with Dr. Neudörfer's designs.

Neuss's Two-Wheeled Litter.—(See drawings Nos. 6 and 7.)—Early in the course of the war of last year, between Germany and Denmark, the Russian Johanniter Orden (Knights of St. John)[‡] had carriages constructed on principles in a great degree similar to those described by Dr. Neudörfer at the factory of the Messrs. Neuss, Government carriage builders at Berlin, but differing in many points of mechanical detail. These carriages were constantly employed in the service of the Prussian wounded throughout the war; but their practical advantages were particularly noticed at the time of the storming of the forts of Düppel. These are the litters to which especial reference has been made at the commencement of these remarks.

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[*] Handbuch der Kriegs-Chirurgie, ein Vade-Mecum für Feldärzte, nach eigenen Erfahrungen bearbeitet, von Dr. J. Neudörfer, etc., etc., Erste Hälfte. Leipzig, 1864.

[†] One of Neudörfer's litters has been written for from Heidelberg for the purpose of testing its qualities at Netley.

[‡] This charitable order established an ambulance at Nübel, at a distance of three miles from the heights of Düppel, and near the road leading both to the forts and to Sonderburg. They also established, by permission of the Prussian Government, other field-hospitals at the seat of war.

One of these conveyances has been obtained from the makers at Berlin for the Army Medical School, with the intention of examining carefully into its alleged merits, and testing them by practical trials, so far as opportunities can be afforded at a home station in time of peace for such observations.

The following is a description of the construction of the conveyance.

It consists of a litter partly made of wood and partly of canvass stretched between two side poles, and placed upon springs; these springs being again made to rest upon an iron axle-pole connecting the two wheels upon which the weight of the whole machine, when in motion, is supported. The side poles are provided with handles at both ends. A single man, on grasping two of the handles at either end, can wheel the machine either by pushing it from behind or by drawing it from the front; or two men, one in front and one behind, can together push and draw it, or can carry the litter, if required, without the wheels being brought into contact with the ground. In order to combine lightness with solidity, the framework has been made of hickory wood. The wheels are also constructed on a peculiar plan, with a view to obtaining the same ends; for each nave is of unusual length, and the spokes, twelve in number, radiating from it to the circumference are alternately inclined in opposite directions, so as to cross each other at very acute angles, and distribute support evenly from whatever side pressure may be principally exerted. (See sketch No. 8.)

Means are provided to support the litter firmly when at rest, and in the absence of an attendant. These means consist of two pairs of strong, well-connected props, one in front and one behind. The hinder prop alone, in conjunction with the wheels, forms a sufficiently stable support for the conveyance. Each prop is so joined to the framework, that, when the two together are resting on the ground, they stretch out at obtuse angles with the middle portion of the litter in opposite directions, and thus ensure perfect stability of the whole. By a simple arrangement, a man pushing this litter from behind, can, without moving from his place, either raise or lower, as well as fix in position at pleasure, both the front and hind supports. The hind support consists of a single piece, but the front support is jointed, so that, when shortened, the litter resting on the wheels and upon this shortened front support has such an inclination given to it, from the head downwards towards the foot, that the ingress or egress of a patient is greatly facilitated.

Considerable attention has been paid in the design of this litter to securing an easy and steady position for a patient while being transported in it. The patient does not lie in a completely horizontal posture; his head and back are somewhat raised, and inclined at an angle with the pelvis and thighs, and these again form an angle with the legs. The head of the patient rests upon a pillow covered with glazed cloth or leather; the back, pelvis, and thighs upon a flexible support of sailcloth, while the part for supporting the legs and feet consists entirely of wood. There are two padded supports for the arms and elbows of the patient. A folding sailcloth hood is fixed to the upper end of the carriage, and can be drawn over the head and shoulders of the patient, so as to form a sun-shade or protection against rain, without interfering with the free access of air. A cover of sailcloth is also rolled up and fastened by two straps at the foot of the litter. This covering, when unrolled, can be drawn up so as to lie under the upper edge of the expanded hood, and be fastened to the upper part of the framework. By these means the patient, during transport, can be protected against dust or inclement weather on every side.

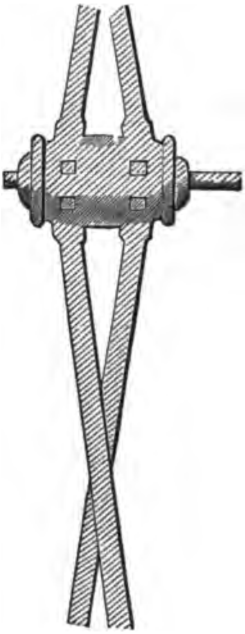
Under the part which is made to support the head and shoulders of the patient, there is a space enclosed within two wooden sides, and a floor of strong sacking, capable of carrying refreshments, bandages, or other parcels to the front, or of receiving the knapsack or accoutrements of a wounded man who may have to be transported to the rear. This space is covered behind with a canvass flap secured by a button.

The weight of the litter complete as thus described, on weighing it at the Royal Victoria Hospital, has been found to be 109 lbs. 13 oz. avoirdupois.

As already mentioned, very strong testimony has been given in favour of this form of litter by some of the surgeons who saw them in use in the late Schleswig-Holstein campaign. Dr. Gurlt, Professor of Surgery in the Royal

No. 8.

Neuss's Two-wheeled Litter.



Construction of the wheels.
(See descriptive remarks.)

Prussian University at Berlin, thus writes of it from his own practical experience :[*]—"If I am asked how this litter answers, I can guarantee its excellence from my own observation. The circumstances under which these litters were employed before and after the storming of the forts of Düppel were particularly favourable, because good roads, or the high road to Sonderburg, could be used in moving the wounded from the front to the rear, and thence to the hospital. But I have also seen them answer well on uneven ground, ploughed fields, and the like. Even obstacles of a formidable nature which could never be passed by an ordinary waggon, are easily overcome by these two-wheeled litters; for, with two men only with them, they can be easily lifted over such impediments, like the ordinary hand litters, without any interference from the wheels, on account of their extreme lightness.

"Besides this, on exceedingly uneven ground, jolts and rough movements can be spared the wounded man by attentive porters; for, as soon as the litter must pass over hillocks and through ditches, all jolting of the vehicle can be prevented by lifting one or both wheels from the ground. On even roads, one man is able to convey this litter long distances without fatigue, alternately pushing or pulling, according as he places himself behind or in front of the conveyance.

"On the march these litters are either pushed or pulled by the men, and they can be used, as I have often seen them, for holding their knapsacks: or two or more of them can be fastened behind each other to the rear of a waggon; or, lastly, by removing the wheels, they can be easily packed upon waggons."

Dr. Neudörfer, the Austrian military surgeon whose name has been before mentioned, has also borne strong testimony to the success of these two-wheeled conveyances in the late campaign against Denmark. He writes, in the course of an official report on the wounded in Schleswig, as follows, respecting them :[†]—"Although, from the very nature of war, it is impossible to provide completely for the requirements of the wounded, yet it would be impossible to shut our eyes to the immense improvement that these wheeled carriages present over all former means of transport. It was proved beyond doubt that in my wheeled barrows severely wounded men could be transported with even less injury than in other carriages, both over rough ground and high roads; that they, moreover, required fewer men than other conveyances, and that these men, being less fatigued, could continue at their work for longer periods together."

The opinions expressed by these eminent and experienced surgeons are entitled to great respect; and, after careful examination and trial of the two-wheeled litter, I am led to agree with much that has been advanced by them in favour of this field conveyance. But, although believing it likely that wheeled hand-litters may be destined hereafter to take an important part in the transport of wounded in time of war, especially on the Continent, I cannot concur in the opinion that they are calculated to supplant the ordinary means of conveyance borne by men and animals. Neither does my observation of the wheeled litter lead me to believe it to be adapted to the *general* requirements of transport conveyances for the British military service, although, in certain situations, and under special circumstances in that service, I think it may constitute a form of conveyance preferable to any other for removing the wounded from the place of action to the first line of surgical assistance, and thence to the field hospitals.

I will briefly explain the grounds on which the views I have just expressed have been based, and define the limitations which it appears to me the circumstances of the British service will cause the use of these wheeled litters to be subjected to, in case they are introduced among the number of its conveyances for sick and wounded soldiers.

Firstly, as to its fitness as regards the ease afforded by it to a wounded man during the act of transportation. All the requirements in this respect are met, as far as practicable, by the two-wheeled litter. It is superior, as regards ease of position, to either the plain stretcher or to the mule litter. This fact is owing to the soft, and at the same time firm, nature of the support, as well as to the respective degrees of inclination given to the head, shoulders, and thighs of the patient. It is the easiest position in which a patient could be placed who is faint from loss of blood or from the effects of injury, while, in whatever region of the body the wound may have been received, the injured part may be as carefully protected from additional hurt during the conveyance as on an ordinary stretcher, and more so than on either the cacolet or mule litter. The only conveyance, perhaps, which offers equal advantages in regard to securing ease of position for the patient is the Indian dhooley. The back of the conveyance is not adapted for being raised or lowered, as in Evans' hand-litter; but it can rarely happen that such a change is necessary during the first transport of wounded, for which the latter is chiefly designed, and firmness is gained by the absence of the mechanical contrivances which would be necessary for such an adaptation. At the same time the head and shoulders of the patient can be readily raised, if necessary, as in ordinary stretchers, by placing articles of clothing beneath them.

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[*] "Militär Chirurgische Fragmente, von Dr. E. Gurlt, Berlin, 1864," p. 7, &c.

[†] "Aus dem feld-ärztlichen Berichte über die Verwundeten in Schleswig, von Dr. J. Neudörfer, Berlin, 1864," pp. 7, &c.

When the ground is level, over a gravel road, or over pasture, for instance, the patient is not subjected to jolting from the motion of the conveyance. The springs prevent this. When the conveyance is wheeled over ploughed land, there is more jolting than there is when a patient is carried upon an ordinary stretcher by well-trained bearers. This jolting can be prevented, in the same way that it is in the stretcher, by two bearers carrying the wheeled litter. It is, however, a heavier load for the bearers.

If the road be favourable, the patient can be much more rapidly conveyed to the place of surgical assistance than he can be by the ordinary stretcher, or even by the mule-litters; for the animals carrying these latter conveyances have to be restricted to a walking pace.

Secondly, as regards advantage in saving of labour. If the ground be favourable, one man can easily transport a patient by means of this conveyance to any usually required distance, and with very little fatigue, because the muscular exertion is moderate, and is capable of being varied. Under these circumstances, there is very considerable saving of labour, both from one man being able to do the usual work of two or more men, from his being able to accomplish it more speedily, and from his being less fatigued at its conclusion, and, therefore, the sooner available for other duty. Evans' and Neudörfer's two-wheeled litters would appear to be even more economical in labour than Neuss's, as, with them, under similar circumstances, two men, it is stated, could be easily transported by a single porter. Practical experiments, with a view to comparing the relative amount of ease and speed with which these litters, when supporting two persons, can be wheeled by a single attendant, are necessary for establishing this point. The small wheel of Evans's litter would probably cause the speed of its movements to be less, and the exertion of the porter to be greater, when compared with either Neuss's or Neudörfer's litters.

If, however, the ground be unfavourable, two men are required for the transport of a patient; and there does not appear to be any reason for concluding that the two-wheeled litter would, so far as labour is concerned, be then more advantageous than an ordinary stretcher, or so advantageous as the mule transport of two men under the guidance of a single soldier.

Thirdly, as to its portability. The Berlin litter can be readily transported when ordinary roads, railroads, or moderately even ground, are available, either by being moved on its own wheels, or by its wheels being removed and packed with the litter. But, under these latter circumstances, the package is a large one, and not calculated to resist with impunity any rough usage.

It is not fitted for transport by sea. It cannot be taken in pieces, so as to be put together into a compact package. Although the wheels are removed it is still bulky, and there remain many projecting parts, and these of comparatively little power of resistance, which will be constantly exposed to injury in the movements of a transport vessel in bad weather. This defect would quite unfit it, in its present state, for the general requirements of the British service. It is a necessity arising from the insular nature of Great Britain, that such conveyances should be simple in construction, easily taken asunder and packed, that such packages should be fully capable of resisting the shocks to which they are liable during a sea-voyage, and that the parts should be fitted for being readily put together again on landing at the conclusion of the voyage. These qualities are not found in the Berlin two-wheeled litter.*

Fourthly, as to its capability of repair. Independently of the inconveniences which would arise from its bulk if it had to be transported in its complete state, the nature of the construction of the conveyance would cause it to be easily injured if subjected to undue violence, whether on shipboard or elsewhere. If the wheels or springs were injured, they could not be repaired under ordinary circumstances in the field. Spare wheels would be required to be taken for supplementing those which might be damaged, as is done in ordinary ordnance carriages. This objection would not hold good if the means of repairing such defects were at hand, as they probably were in Germany.

Fifthly, as to the cost. Dr. Neudörfer has made a calculation of the probable cost of an equipment of these litters, when made according to his designs, necessary for an Austrian army of forty brigades, supposing that all other forms of sick transport conveyances be abandoned. He remarks as follows:—"I find that my vehicles can be made, strong and fit for service, for about 100 florins each (10*l.*); so that, for each infantry brigade, 5,000 florins (500*l.*), and for an army of forty brigades, 200,000 florins (20,000*l.*) will be the cost. This sum is large, but, as every nation must necessarily improve its artillery and keep progress with the times, so must it similarly improve the means of transport for its wounded, unless it wishes to be left behind in the race both of military science and of philanthropy."† The cost of the Berlin two-wheeled litter sent to the Army Medical School was 15*l.*, irrespective of the expenses of its carriage from Berlin to England. But the real cost of these conveyances can only be ascertained by actual experience in field use, for the cost is not merely the first outlay, but should include the expenses of repairs, and, indeed, involves the whole question of strength and durability when a comparison between it and the other transport conveyances in this respect is instituted.

In conclusion, on considering all the circumstances above stated, it does not appear that the two-wheeled litter, notwithstanding its alleged utility and success in the late war against Denmark, is fitted for the *general* service of the British army for the transport of wounded in time of war. Here, its want of portability for stowage on board ship, its liability to injury, and the absence of facilities for repair, counterbalance its advantages. It would certainly be unwise to recommend it as a substitute for transport conveyances, the superior merits of which in respect to those qualities in which it is defective, and which are so important in the British service, have been practically tested and established, before it has received a more extended trial than it has hitherto been subjected to in field operations.

On the other hand, the superior advantages of these litters over other conveyances in the exceedingly easy position afforded by them to sick or wounded soldiers, in the little injury the patients are liable to be subjected to from shocks or from jolting during the transport, in the rapidity of their movement, the economy of labour, the ease with which they can be caused to travel long distances, together with the fact that they possess sufficient strength for all ordinary legitimate uses, render them not only appropriate, but, perhaps, the most appropriate transport conveyances that can be devised for use under certain special circumstances. Among a civilised community, with good roads, so that the ground between the scene of action and the lines of surgical assistance is likely to be tolerably regular and level, and where no necessity exists for transport by sea, or close package of the vehicles themselves, they seem to offer every advantage that can be expected to be found in any ambulance carriage.‡

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* Even in the passage from Hamburg to Southampton on a steamer, and carefully packed, the two-wheeled conveyance obtained for the Army Medical School had one handle broken off, and was defective from the loss of two or three minor parts which had to be replaced before it could be fitted for use.

† Op. Cit., p. 10.

‡ One of these litters has been in use during the present year up to this date, (2nd June, 1865) in removing invalids requiring a recumbent position from the landing place to the Royal Victoria Hospital. The first part of the road from the beach has a very steep incline, the remainder has only a gentle slope. The regulation stretcher, Russell's spring dhooley or stretcher, Hopper's invalid chair, the China ambulance barrow, have been also employed for the same purpose, Preference has

Two other advantages, not enumerated in the above *resumé*, may be noticed. With the hand-wheel litter, it is not necessary to disturb the patient during the transport, in case of the conductor wishing to halt for a time, as must be done, to a certain extent, where the bearers of a stretcher place it on the ground in order to give themselves rest. Neither does it require any training to be able to conduct the movements of the wheeled litter, but only common care and attention; whereas, with the ordinary stretcher, a certain amount of previous practice is necessary to enable the bearers to carry a wounded man in such a way as not to aggravate his suffering by jolting or uneven movement. With mule-ambulance transport, also, quietness of the animal, and special training of the conductor, are both necessary to ensure ease to the patient; and with ambulance carts and waggons, considerable skill is required for driving properly. Nothing can be simpler than the management of the two-wheeled litter.

If an enemy were to attack the shores of this island, and a conflict occurred, I cannot imagine a more efficient hand-conveyance than such wheeled litters would afford. The wounded could be rapidly transferred by their means from the scene of action to the stations for the first dressings, and from these latter to appointed hospitals; or, if a railway were near at hand, could be carried to stations for removal to longer distances with the greatest amount of ease that the particular conditions of each wounded man would render admissible. The circumstances under which they seem to have been so successfully employed after the assault on the forts of Düppel and elsewhere in the recent war between Germany and Denmark, appear, from the descriptions, to have been of a nature, in many respects, similar to those I have just contemplated, and these are the conditions for which careful examination of the Berlin hand-wheel litters would have led me to conclude them to be particularly well adapted, even without the practical proofs of their advantages which that campaign is stated to have afforded, and to which I believe their employment should be limited.

A NEW METHOD OF TREATMENT FOR GUNSHOT WOUNDS.

New method of treatment proposed for rapidly healing gun-shot wounds, by incising them at their orifices, and enclosing them within elliptical flaps of skin, so as to convert them into subcutaneous injuries.

Forwarded, with Remarks, by Deputy Inspector-General T. Longmore.

The following novel method of treatment for the purpose of rapidly healing gun-shot wounds has been advocated by J. Julian Chisolm, M.D., Professor of Surgery in the Medical College of South Carolina, and author of "A Manual of Military Surgery, for the use of Surgeons in the Confederate States' Army." The operative details of the proposed plan of treatment are so fully described in Dr. Chisolm's remarks that no further description of them are called for. Dr. Chisolm's incisions at the orifices of the wound differ entirely in their nature and purpose from the scarifications which were once in general use, and which were intended to change in some degree the characters of wounds inflicted by projectiles, by lessening inflammatory action and its consequences, relieving tension, and giving a freer way of escape for the sloughs and suppurative discharges. The old plan of incising gun-shot wounds in all cases, merely because they were gun-shot wounds, John Hunter proved to be an useless aggravation of the original injuries, and though his views were opposed

been universally given to the two-wheeled litter, on account of the several advantageous qualities above enumerated. On arriving at the entrance of the hospital, no difficulty has been experienced in carrying the litter with the patient upon it up the six steps leading into the corridor, or, if the wheels be shifted, to the upper stories of the building.

by John Bell[*] and others, his arguments had such weight that English surgeons, in consequence of them, altogether discarded the practice. In the plan recommended by Dr. Chisolm the track of the ball, and the contused tissues which line its surface, are in no way interfered with, but the efforts of the surgeon are simply directed to shutting them up completely so as to prevent their contact with the external air. Those who have accepted, as an axiom in surgery, the principle that, as John Hunter describes it, "the circumstance of gun-shot wounds being contused wounds obliges most of them to suppurate, because in such cases there is more or less of a slough to be thrown off, especially at the orifice made by the entrance of the ball,"[†] will find it very difficult to anticipate success from the treatment advocated by Dr. Chisolm, so entire an innovation is it upon this principle, and so contrary to existing ideas and general practice. From the high position, however, held by its author, as well as his extensive experience as a surgeon in America and Europe,[‡] it seems desirable to call attention to his views, so that they may be submitted, on occasion occurring, to the test of practical experience in those cases to which they appear applicable.[§] It is asserted that the practice of "hermetically sealing" gun-shot wounds of the chest, to which the treatment advocated by Dr. Chisolm for gun-shot wounds in general is closely analogous in principle, has been attended with successful results in some of the hospitals of the United States; and we are also to some extent encouraged in making a trial of the proposed treatment by the known advantages of converting a compound fracture into a simple one by closing the wound in the soft parts as early as possible. Under any circumstances, the operative interference described by Dr. Chisolm is easily conducted, and is not attended with any likelihood of harming the patients in whose cases it may be adopted, even if the advantages it is supposed to offer be not attained.

The following are Dr. Chisolm's remarks on the treatment proposed by him for gun-shot wounds:—

"It is a familiar fact to hospital surgeons that where balls course for some distance through the tissues, these long tracks often heal without suppuration, leaving only two disc-like, raw surfaces, which heal with very little discharge.

"The rapid closure of these tracks is particularly observed in wounds so situated that the walls of the track are kept in constant apposition at one or more points, thus excluding air. The crushed tissues along these tracks may slough, but it is a molecular disintegration, solution, and absorption, simulating the disappearance of extensive extravasation of blood, or the extensive subcutaneous bruising from shell-wounds, where the skin is not broken.

"In such cases of rapid healing we never find that excessive deposit of lymph, gluing together muscles, and interfering for a long time after cicatrization with the use of the limb. Led by this experience, I would suggest to the Medical Staff of the Army a simple method of rapidly curing gun-shot wounds, which promises the most valuable results. It consists in converting all gun-shot wounds into subcutaneous injuries. Immediately after the injury has been received, when all foreign bodies have been removed, including fragments of bone, and when hemorrhage has been checked, but long before any reaction has been established, make two elliptical incisions, extending only through the thickness of the skin, and enclosing the wound with its immediate surroundings of crushed tissues. Dissect up this elliptical flap of skin from the muscles, and two clean incisions are substituted for the ragged wound. If these incisions are carefully brought together by sutures, and the limb or trunk be supported by a roll of bandage, they will rapidly unite by the first intention, converting the track, however long it may be, into a subcutaneous wound, which will heal rapidly, without suppuration, by a process known as the remodelling process, which is well exemplified in the subcutaneous division of tendons.

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[*] "The first great point to be established is the propriety of scarifying these wounds, merely as they are gun-shot wounds, &c." "Discourses on the Nature and Cure of Wounds." By John Bell. Edin., 1795, p. 190.

[†] "Works of John Hunter." 4to. edition. London, 1794, p. 528.

[‡] Dr. Chisolm was present during the Italian campaign of 1859.

[§] A notice of this method of treatment has been forwarded to the Principal Medical Officer at New Zealand, so that the surgeons employed in active operations in the field in that country might have the opportunity of adopting it, provided no objections were met with to the practice.

"As the resection of the wounds extends solely through the skin, the operation is trifling, adding nothing to the serious character of the injury should the incisions not heal by the first intention. Should quick union be obtained, comparatively speaking a cure is effected in from forty-eight to seventy-two hours, which, under the usual conditions, will require weeks, and may not be cured for months; the patient escaping all of the dangers from hospital gangrene, secondary hemorrhage, and the common one of protracted suppuration, followed often by contracted limbs; and, besides a large saving of human life, the Government saving in hospital accommodation, in supplies for the wounded, in the avoidance of long and frequently repeated furloughs, and in the speedy restoration of the wounded, to add to the effective strength of the army in the field. Nearly the entire treatment of the wounded should be perfected at the field infirmaries. In the few days following a battle, while the wounded are awaiting transportation, the outer orifices of their wounds can be healed, and the cases, now being beyond all danger, could be directly furloughed for a short period without going into hospital.

"The chief objection raised by the inexperienced, viz., that the skin will not unite over an excavated track, is confuted by the every-day occurrence familiar to field-surgeons, viz., that when a ball traverses a limb, remaining under the skin on the opposite side to the orifice of entrance, the incision to remove the ball will heal up at once, if any care be taken to keep the lips of the incision in apposition, although the track of the ball leads directly to the incision.

"The only other objection which can be brought up against the method of rapidly healing gun-shot wounds is the general belief that the long track of the wound is lined with crushed tissues, which will slough. Experience constantly teaches us that, if the air be excluded, such injured tissues will disappear by absorption, and the track heal up rapidly without any outward manifestation; and that in surgery, where we are called upon to crush or tear up tumours subcutaneously, suppuration and sloughing never ensue."

TYPHOID FEVER AT BANGALORE.

Extracted from the Annual Report of the 66th Regiment. By Wm. Sim Murray, Esq., M.B., Surgeon 66th Regiment.

1. Private W. B., aged 26, of eight years service, of which five in Malabar, an Englishman, a stonemason, a steady, temperate man, generally in very good health, was admitted into hospital on the 8th March, suffering from bronchitis. Had a depressed, wearied, and exhausted appearance on admission, but febrile symptoms by no means well marked or distinct. On the 11th, was seized with frequent purging, uneasiness in the bowels, with furred tongue, and quick, weak pulse, skin moist. From this time the symptoms were variable, but, on the whole, more aggravated, the tongue becoming dry, brown, and cracked in the centre. Pulse over 100, small and weak, with frequent thin, feculent stools, crepitus over the bases of both lungs, with expectoration tinged with blood, but no uneasiness or tenderness in the bowels after the 13th. On the 18th March, or the fourteenth day of his illness, the symptoms were all improved, and continued to show signs of gradual amendment until the morning of the 23rd, when he was seized with a severe rigor which lasted half an hour. After this he rapidly sank, and died on the 24th March, the twentieth day of the disease. There were no maculæ observed whatever in the course of the case. The following were the appearances observed after death:—

Thorax.—Lungs both slightly congested posteriorly, but otherwise quite healthy. Heart perfectly healthy. About two ounces of clear serum in the pericardium.

Abdomen.—Twenty-six ounces of turbid serum, with flakes of coagulable lymph in the peritoneal cavity. Peritonœum much inflamed. Mucous membrane lining the ileum inflamed, and Peyer's glands ulcerated. No perforation to be detected. Two lumbrici found in the jejunum. Other parts of intestinal mucous membrane healthy. Liver and spleen both somewhat large. Kidneys healthy.

2. Serjeant J. B., aged 26 years, of seven years service, of which five in Malabar, an Englishman, a labourer, who had been a good deal in hospital with venereal and other ailments, was admitted on the 10th March, labouring under symptoms of ordinary fever, which showed no indications of severity until the eleventh day of illness, when the case took a turn for the worse. The skin became hot and burning, the pulse quickened to 88, and the bowels had a tendency to looseness. He became heavy and listless, and expressed pain when pressure was made on the iliac region. Tongue coated with a white fur.

This case, again, like the former one, showed delusive signs of gradual though variable improvement. The stools, from being frequent and thin, became more moderate, and also improved in consistence, the skin cool and the tongue clean, and the pulse fell in frequency, and, on the whole, the case bade fair eventually to do well, when, on the twenty-third day of illness, the pulse became accelerated, skin hot, one motion thin and slightly streaked with blood. General appearance sunken, and integument dusky. He became restless and incoherent; tongue became dry and brown, the motions passed in bed, and he rapidly sank from this time, and died on April 3rd, the twenty-sixth day of illness. No maculæ were observed throughout the course of the case.

The *treatment* consisted in the exhibition of an emetic on admission, subsequently of diaphoretics and quinine, enemata of hot barley-water, hot foot-baths, blister to nape, turpentine stupes to the bowels, a repetition of quinine combined, first, with James' powder, and afterwards with ipecacuanha and Dover's powder, wine, chicken-broth, and beef-tea, astringents, and stimulants.

The following were the appearances presented after death:—

Thorax.—Left lung adherent to parietes by firm, old, adhesions; lung engorged with blood, but otherwise healthy. Right lung congested posteriorly. Heart healthy.

Abdomen.—The mucous membrane of the ileum covered throughout with large circular and oval ulcers. Adjacent part of cœcum and colon much injected. Kidneys and spleen congested. Other abdominal organs healthy.

3. Acting Hospital-Serjeant W. H., aged 23, of four years and ten months service, of which three years and ten months in Cannanore, an Englishman, a teacher, was admitted into hospital on the 26th March, complaining of having felt rather unwell for some days, suffering from occasional slight chills and a tendency to diarrhœa, with loss of appetite. Tongue loaded with a thick whitish fur. Skin hot and pulse quick. Complains of thirst and swimming in the head. On the third day of his admission, pulse 104, sharp; swimming in head continues; no sleep; bowels moved by castor-oil; tongue moist, and covered with a creamy fur. Perspired freely in the course of the day, and was restless and incoherent, the pulse rising to 120; no tenderness in bowels. The symptoms became gradually worse from this time, but there was no looseness in the bowels, which required mild laxatives for their operation. He became fidgetty, restless, talkative, and, on the fifth day, is noted as picking the bed-clothes. Lips and teeth dark from deposit of sordes; pulse extremely feeble and quick (from 128 to 138); abdomen becoming distended and tympanitic; tongue brown and dry; urine passed in bed. He never rallied, but died on the 31st March, the sixth day of his treatment. No maculæ observed throughout.

The *treatment* consisted in the exhibition of an emetic on his admission, with a subsequent dose of castor-oil, diaphoretics, blister to nape, hot foot-baths, stimulants, laxative enamata, tartar-emetic in combination with opium, wine, beef-tea, and other stimulants.

The following were the *post-mortem appearances*:—

Thorax.—Both lungs adherent to parietes by strong adhesions, and both engorged with blood.

Heart.—Its cavities and the great vessels attached full of dark, fluid blood, but otherwise healthy.

Abdomen.—Intestines distended with gas. Five or six oblong patches of ulceration affecting Peyer's gland in the ileum, and several smaller circular ones in the same intestine, the mucous membrane of which was inflamed generally. Other intestines and abdominal organs healthy.

4. Corporal D. M., aged 23, of five years service, an English porter, a healthy-looking young man, admitted into hospital April 5th, complaining of chills, headache, and pains in the limbs. Skin very hot and dry; pulse quick; tongue furred. Had an emetic, with a diaphoretic mixture subsequently. Headache, thirst, and fever continued on the third day; pulse 100, full; tongue whitish; bowels confined; had perspired freely. Bowels were moved by an enema, the diaphoretic continued, the pulse rising, in the evening, to 110, with skin hot and dry again. Had a hot foot-bath and James' powder at bed-time; passed a restless night; skin still very hot and dry; tongue creamy. On the fifth day no improvement in the symptoms; bowels opened by castor-oil. A number of rose-coloured spots became visible on the abdomen, and a few spots of a purple colour on his sides and arms; pulse 120. The treatment was continued, with wine, beef-tea, and stimulants, but no improvement in the symptoms, the mouth becoming covered with sordes. He gradually sank, and died on the 11th April, the seventh day of his illness.

The following were the appearances presented after death:—

Thorax.—Both lungs perfectly healthy, but full of dark-coloured blood. Heart and great vessels full of dark-coloured blood, but healthy.

Abdomen.—Large intestines healthy. The ileum was somewhat congested, not continuously, but in patches. Within about three inches of its termination in the cœcum, a solitary ulcer was discovered, about the size of a shilling, hard, elevated, and covered with a yellow slough. All the other abdominal organs were found perfectly healthy.

Remarks.

I attribute the malignity of the type of the fever in these four cases to noxious influences more particularly affecting the hospital atmosphere; for, on the partial removal of these influences, the virulence in the character of the disease at once ceased, and no fatal case subsequently occurred. Moreover, it is worthy of remark that the most virulent of all the cases occurred in the person of the hospital-serjeant, a healthy young man, who was, from the first, completely prostrated by the activity of the poison, never rallied, and died after an illness of six days. This man, it is unnecessary to remark, had been living in quarters within the hospital enclosure.

The noxious influences alluded to were,—

1st. A belt of privies around the hospital, consisting of two barrack privies in front, two hospital privies immediately in rear, and having direct communication with the wards by means of enclosed and covered ways, which acted as funnels for the conduct of emanations into the wards; a woman's privy at the north-east, and another at the north-west corner of the hospital enclosure, and a staff-serjeants' privy on the western wall.

2nd. A high wall surrounding the hospital and overtopping the walls of the building.

3rd. Radical defects in the hospital itself as to ventilation and space.

On my urgent representation the wall was at once pulled down, and the three smaller privies either removed or shut up. The barrack and hospital latrines were, as a matter of course, not capable of removal, and must remain a permanent nuisance while the barracks are occupied by troops, notwithstanding their being kept in as clean and satisfactory a sanitary state as possible.

THREE CASES OF HYDROPHOBIA.

1. (Abridged from a Report by Assistant-Surgeon P. N. Jackson, 1st Battalion 13th Regiment.)

Private G. L. 23 years of age and of six years service, by former trade a boatman, a stout, healthy, very active Englishman, and the champion runner of the regiment, was employed on severe fatigue duty on the afternoon of the 5th June, 1864, at 4·30 P.M., when he complained of unusual exhaustion, and shortly afterwards of a cold shivering, which induced him to retire at once to bed.

He felt no better on the following morning and as he had a difficulty of breathing, it was thought a night's rest in hospital, and the application of mustard to the chest might be of service. On the 27th, however, when he came more particularly under treatment, he evinced all the symptoms of incipient hydrophobia. He had no appetite, had an anxious, frightened, look, started when touched, felt stiffness in the neck, and pain in the head and shoulders, could swallow bread or a pill when desired, but was thrown into a violent convulsion by an attempt to drink some cold water offered to him. This paroxysm lasted a few seconds, during which he clutched his throat with both hands, and sprang out of bed. He then became quiet, felt chilly, and sat up in bed. The paroxym was renewed in the evening when he again attempted to drink, and he began to spit quantities of a thick viscid mucus. From this time he got worse, his respiration became convulsive and sobbing, and the slightest noise or movement—even his own attempts to pass water—caused a repetition of the paroxysm. The skin continued warm and moist; the pulse compressible, of moderate volume and 108; the tongue thickly coated. At 9 P.M. he was induced to swallow a draught of chloroform and laudanum, of each twenty minims, in camphor mixture; but the convulsions now became more violent and frequent, until their fury completely exhausted him, after which he seemed more rational, but sank at half past ten o'clock.

The *autopsy* was held twelve hours afterwards. There was considerable surface lividity, no scar visible, fingers clenched, membranes of the brain congested, but brain substance healthy, a drachm of bloody serum in the lateral ventricles, lungs congested, and the air passages full of a frothy fluid, heart cavities contained blood of tarry colour and consistence; slight increase of vascularity in the abdominal viscera; fauces normal, spinal chord not examined.

It was afterwards ascertained that about fifteen weeks previously, on the homeward voyage from Calcutta, a dog—usually very quiet and affectionate—became restless and ill-tempered, and bit five men, including his own master, and the subject of the present report. The dog was at once thrown overboard. Two of the men applied salt and water to their wounds, one had recourse to suction, and the fourth took no precaution; none of them thought much of the matter, or reported themselves. They bear no scar, and are, at the interval of six months, quite well.

2. (Abridged from a Report by Dr. Stewart, Surgeon 98th Regiment.)

Private C. O.; 35 years of age, and of nine years service; a dark muscular Englishman, was bitten in several places by a dog he met on the road, on the 24th of October, 1864. He went to hospital, had the wounds washed and cauterized, and was discharged cured on the 8th of November.

On the 20th he again presented himself at hospital complaining of an inclination to wander in his mind, and looking anxious and fidgety. Pulse quick, feeble and compressible, face pale, surface cool. He swallowed two draughts of ammonia and quinine, and laudanum with ammonia, with difficulty, and twitchings of the face. Deglutition spasmodic. Respiration on such attempts hurried and sobbing. He had a turpentine and assafœtida enema at noon, and chicken broth twice between that and four with similar demonstrations. The tongue was white and moist, and pharynx injected, but no pain. A blister was applied along the course of the spine from occiput to lower end of scapulæ, and thirty drops of laudanum with five grains of carbonate of ammonia, given in draught. In the evening he commenced to take the extract of cannabis indica, eight grains, up to 11 P.M. He slept none all night, and took sixteen grains of the extract before morning, besides having an opiate enema. The symptoms have slowly progressed and are now more distressing—the slightest movement causing sobbing and convulsion. He is having regular enemata of beef tea and wine every four hours.

At noon of the 21st, it was decided to give the calomel treatment a trial; accordingly he had half a drachm of calomel every hour for four hours, and general mercurial inunction. The endermic effects of two grains of muriate of morphia over the blistered spinal surface were simultaneously tried, and the blistering continued down to the sacrum; notwithstanding these measures all the symptoms distressingly increased until the evening, when a fifth dose of the calomel was given, and the mercurial inunction repeated a fourth time. He had two thin and bilious looking motions, but there was no soreness or swelling of the gums. The temperature of the body now began to decline, and at 9·30 P.M. it was thought well to give five grains of the cannabis and repeat it in two hours. From 2 A.M. on the 22nd there was a remarkable change for the worse. His countenance was wild and haggard, at times vacant. Frothed at the mouth, and exhausted by furious convulsions, he died at 4·30 A.M. in a state of partial opisthotonos.

The post mortem examination revealed traces of old disease within the cranium, and there was slight increase of vascularity throughout. Some effused blood was found in the upper part of the spinal canal, and its lining membrane was much congested. There were also appearances of recently effused lymph in the cervical portion of the sheath.

3. (Abridged from a Report by Assistant-Surgeon J. H. Whittaker, 69th Regiment).

Private J. S. of the 69th Regiment; 29 years of age, and of five years service, of which three and a half were in India; an intemperate man and of general bad character, was admitted into hospital on the evening of the 17th June, 1863, complaining of dyspnœa, oppression of chest, tightness and constriction about the larynx and trachea, and inability to swallow liquids. He stated that he was seized with shiverings on the morning of the 17th June, when on fatigue duty, and fancying he had ague he went to the canteen for a dram of arrack. This he got down with much difficulty, and did not eat or drink again up to the period of his admission. He said he was bitten two month before by a puppy, and showed a scar on his thumb. He had not applied anything to the bite at the time. The puppy had evinced strangeness of manner, and for some days attemped to bite every one that came near him, and he was accordingly destroyed.

On admission the patient had an antispasmodic draught, and sinapisms to the chest, and was pretty quiet until the following morning. At 8 A.M. on the 18th spasmodic twitchings of the hands and feet came on, with heavy moaning respiration. His face was pale, and his look wild and terror-stricken. He complained of tightness of the chest and constriction of the larynx, but all the thoracic sounds were normal. His pulse was 60, and feeble and intermitting after every 6th beat; bowels much constipated. No appearances at the cicatrix. He felt nameless horror at the sight or mention of liquids, and swallowed his medicine with infinite trouble. He was now ordered a turpentine enema, and mercurial inunction to the thighs. A blister was applied over the course of the pneumogastric nerve and half a drachm of the tincture of Indian hemp directed to be taken every hour. Ice *ad libitum* to suck. Two hours afterwards an additional draught containing half a drachm of chloroform was given. The symptoms continued increasing in severity under the same treatment continued up to 8 P.M., when an unsuccessful attempt was made to put the man under the influence of chloroform. His violence frustrated every effort. The mucus gradually accumulated in his throat, the paroxysms became more frequent, stronger, and more prolonged, until he sank at 11.45 P.M. He occasionally emitted a sound like the barking of a dog.

The autopsy, 12 hours after death, revealed considerable general increase of vascularity in the cerebrum and its membranes, the latter here and there showing a mottled ecchymosed appearance. The brain matter was preternaturally firm. The cerebellum partook of the general vascularity of the cranial contents. The vascular covering of the spinal chord was throughout congested, but the substance of the chord seemed natural, and there was no effusion. The lungs, liver, larynx, and trachea were congested, and all the other organs healthy.

CASE OF "ECHINOCOCCUS ALTRICIPARIENS" OF THE KIDNEY.

Reported by Dr. A. Leith Adams, Surgeon 1st Battalion 22nd Regiment.

Private P., 35 years of age, of a sallow and unhealthy aspect, served in India eleven years, and in Malta for the last three years. Stated that he was not aware that he ever suffered from tape-worm, although many of his comrades were annoyed by them in both the above stations. For several years, and shortly after arrival from India, in 1854, he had been subject to weakness and pain in the loins, especially over the left kidney, which he supposed were connected with stone in the bladder. On the 2nd of April, 1862, he came to hospital with severe pains in the lumbar region, shooting downwards towards the bladder and along the lower edge of the ribs towards the stomach, accompanied with pricking sensations in the urethra, all of which he stated had been gradually increasing in severity for twelve days. His sufferings were intense, and obliged him to stoop when walking, and lie in bed with his legs drawn up. Neither opium nor the warm bath afforded any relief, and he spent a sleepless night, until the following morning, when making water, the urethra felt as if partially obstructed by a foreign body, which turned out to be a colony of echinococci, varying in size from a hemp-seed to a sparrow's egg. This was followed by a great mitigation of his sufferings, and in the course of half an hour he passed more, when all the symptoms vanished, and he was restored to health, and left hospital in a few days to all appearance cured. For the following four months he remained free from any of his former sensations, and seemed to have greatly improved in health, until on the 4th of August, and on four subsequent occasions within a space of five weeks, he was suddenly seized with the symptoms as above described, followed by instant relief as soon as he voided the echinococci, which generally came away in groups of various sizes, ranging from a pea to torn parts of what must have equalled a pigeon's egg. After an interval of eight months, during which he seemed in the enjoyment of good health, and was free from any symptom of the disease, on the 14th May, 1863, similar pains, shooting down the ureters into the bladder, returned with increased severity, and were followed by the passage of a few cysts; but the relief he had experienced on previous occasions did not succeed this attack, and he continued voiding colonies of echinococci about every week, and was seldom free from racking pains in the loins, coupled with loss of appetite and sleep. His general health having failed, and the disease to all appearance progressing, I was obliged to invalid him in October 1863. Since then he has been discharged from the service.

Remarks.—The microscopic appearances of these parasites were as follows:—A double circlet of hooks, varying as to number (as many as forty were counted on one head). Each hook was slender, acute, and tapering to a point. The hooks were best seen in the daughter vesicles, of the size of a hemp-seed. The larger vesicles were generally much torn in their passage down the ureters and urethra. In no specimens could the suckers be made out by a lens multiplying to 500 diameters, but the stratified appearance of the two walls was visible when treated by caustic potash and red ink, as recommended by Küchenmeister. From the above, and the regular shape and perfectly uniform size of the calcareous capsules, there can be little doubt as to the identity of this parasite with the *Echinococcus Altriciparienз* of the above-named authority, or what is better known as the *E. Hominis.*

From the man's statements he had been subject to the sensations more or less from the date of his arrival from India, where, in all probability, he contracted the disease. Moreover, it may not be unlikely that he passed cysts unconsciously long before they were discovered. The matured tape-worm (*Tænia Mediocanellata*) was very common in the men of the battalion in India, and is the species so prevalent in Malta,—at least among many heads examined by me from patients who contracted tape-worm in both stations, I have never been able to discern any hooks. Moreover the obstinacy wherewith this parasite adheres to the intestinal canal, in spite of the most powerful remedies, greatly strengthens the opinion. I make no doubt, however, that *Tænia Solium* may likewise be found.

As to the etiology of this case it would be useless to surmise. I have found that, out of 103 carefully recorded examples of *Tænia*, 55 men stated that they had been addicted to eating raw beef, mutton, bacon, and such like, whilst 48 positively abhorred the idea. Many, however, of the latter, preferred animal food underdone. It seems that the habit of chewing lean portions of raw meat is not uncommon among soldiers and the class from which they are generally enlisted ("navvies" in particular). I have been informed by soldiers who know "measled pork," that, when in India, they preferred it to any other sort, on account of its sweet taste. Reflecting that cases of tape-worm are comparatively rare among the officers, it may eventually turn out that the cysticerci of both species are introduced into the stomach, in the majority of cases, by eating raw or underdone flesh. It indicates, therefore, the necessity of being careful to see that the soldiers' rations are well cooked. By the ordinary boiling, this is generally the case; but the baked ration, as prepared here by private contract, is certainly often indifferently cooked. I have not, however, been able to detect the cysticercus in the salt-pork ration nor fresh meat supplied to the regiment, although I have seen it in the livers and flesh of sheep and cattle sold to the natives in the villages of Malta and Gozo, and been informed by venders that what they call "pock-marked flesh" is not uncommon in the country-towns, but is not permitted to be sold in Valetta.

Tænia is not uncommon among the natives. Vegetables enter largely into the soldiers' dieting, and salad is reared in great quantities in their gardens, and often eaten by them; besides, the water-tanks may receive the ova from the surfaces which supply them.

CASE OF IDIOPATHIC GANGRENE OF THE SCROTUM.

By W. H. Pollard, Esq., B.A., Assistant-Surgeon, R.A., Woolwich.

Sergeant H. F., of the 2nd Division, Depôt Brigade, Royal Artillery, 27 years of age, an Englishman, previous to enlistment a clerk of eight years service, of strumous diathesis and delicate appearance, was admitted July 20th, 1864, with a small swelling in the perineum, at the base of the scrotum, attended with considerable feverish symptoms. He had a hip-bath last evening, and remained in it, the water being at high temperature, for more than three-quarters of an hour. Soon after his return to bed, he found that his scrotum had swollen to an enormous extent, and there was considerable tension and inflammation, as if caused by extravasation of urine. A catheter was passed, but there was nothing found wrong in the bladder or urinary passages. His pulse was 140; he perspired freely, and was extremely restless and anxious. He was ordered five ounces of wine, and 40 m. Battley's sedative solution. Next morning a large black spot appeared, which spread rapidly from the upper part of the scrotum towards the base and sides. The perineum has a boggy feel, as if of matter deep-seated. His appetite is bad, and his stomach irritable. There is considerable swelling around, from the sphacelas, and poultices, with charcoal, have been applied. To have milk diet, and ten ounces of port wine with one pint of beef tea.

July 21st.—He passed a much better night; but the gangrene is spreading, and has now involved the whole of the lower half of the scrotum. It looks like one large black slough, and from the red appearance of the perineum, it threatens to spread in that direction. He has charcoal poultices, with stimulating lotions to the part, and takes sedatives and stimulants internally. Stomach very irritable, and he has vomited a good deal; pulse, 145, weak; bowels regular; face very anxious. His wine has been increased to fifteen ounces, with five ounces of brandy.

July 22nd.—This morning a free incision was made in the perineum on each side of the laphe up to the base of the scrotum, cutting down into the abscess, which discharged a small quantity of pus; and, to prevent the absorption into the blood of the effused fluids, free incisions were made into the scrotum, from which there trickled a good deal of fluid mixed with blood. He expressed himself much relieved by this measure. Hot fomentations are to be continued all day, and he is to take one grain of opium, with two grains of extract of henbane, every two hours, and his wine and brandy at regular intervals. He is on chicken diet, with three pints of beef-tea, 20 ounces of wine, and two gills of brandy.

July 23rd.—He passed a very good night, and appears much more cheerful and hopeful this morning. His pulse is stronger and firmer, and less frequent. The tendency to vomit has, in a great measure, ceased, and he now takes his beef-tea with some degree of appetite. Altogether the constitutional symptoms are much improved. The slough does not discharge so freely, and it appears to have ceased to spread, as a line of demarcation is clearly formed all round its upper portion, and at its sides.

The penis has a gangrenous spot on its dorsum, about the size of a shilling, and is a good deal swollen, the redness extending to some distance up the pubis. This distinct slough on the penis points to the idiopathic origin of the sphacelas, and somewhat resembles hospital gangrene. He was removed three days ago to a ward by himself, where he has the advantage of good ventilation, disinfecting fluid being used to purify the room, as the smell is very offensive. He is ordered to continue the hot fomentations and charcoal poultices, and to take his beef-tea and the wine and brandy alternately, in small quantities, and at frequent intervals.

24th.—The mass of slough is separating, and a large portion was taken away this morning. The testicles appear to be uninjured, and the gangrenous spot on the penis remains stationary. He slept very well last night, his pulse is good, and his appetite much improved.

25th.—There is more of the slough coming away, and the sore has assumed a more healthy appearance. Some discharge escapes along the course of the cord from underneath the pubic region. He is generally much better. He is on the same diet, but requires only half the quantity of wine and brandy.

27th.—The last portion of the slough became detached this morning, and he is doing very well. His appetite is very good, and his pulse quite regular.

On the 1st August, he was put on varied diet, with one pint of porter, and from this time he continued to improve very satisfactorily until he was discharged perfectly well on the 8th September. His convalescence was somewhat protracted, owing to the time required for so large an extent of surface to granulate and heal.

27th February, 1865.—I examined him a short time since, and found that a new skin had formed around the denuded testicles, which were quite healthy, and he is in every respect quite well.

TRAUMATIC TETANUS. RECOVERY.

From a Report by Assistant-Surgeon J. Pope, 72nd Highlanders.

Private D. B., Royal Artillery, was admitted into hospital on the 1st of May, 1863, with a self-inflicted gunshot wound of his left hand. There was found to be extensive laceration of the soft parts of the middle and ring fingers, and simple treatment only was necessary. The healing process went on favourably for ten days, when maggots began to collect in the wound. This was accompanied by diminished sensation on the radial aspect of the ring finger. By forceps and applications of creosote and turpentine the maggots were got rid of in a few days. A small piece of bone at this time exfoliated over the metacarpal joint. Three days after this, locked jaw came on, and purgatives, small doses of mercury, with wine and general strengthening food, were given. As, after four days of this treatment, the trismus had not subsided, and stiffness of the back was coming on, constipation was further averted by turpentine enemas; and extract of cannabis indica, in two-grain doses, ordered every third hour. As the spasms now increased and extended, the extract was given in the same doses every half-hour, and nourishment freely administered. On the morning of the 21st day of treatment, much relief was experienced from the combination of two drops of croton oil, with one of the doses of the extract; but next day oposthotonos supervened, which again was relieved by a grain of morphia, under the influence of which he was able to sleep.

By a perseverance in this mode of treatment, and having reliance mainly on the cannabis, the croton oil, the turpentine enemata, and nourishment, he slowly recovered. He continued for many days to have abdominal tension, which was successfully combated by chloroform liniments. This convalescence went on slowly but surely, and on the 77th day from admission he was discharged from hospital to change of air at another station.

CASE OF CŒLIAC ANEURISM.

Reported by Dr. Mackie, Assistant-Surgeon 2nd Battalion 7th Fusileers, Malta.

Private P. B., a strong, muscular, healthy-looking, but hard drinking man, of 31 years of age, was admitted into hospital December 6th, 1863, with considerable febrile symptoms, and complaining of pain at the epigastrium, and in the lower part of the dorsal region—a pain which he first felt about a week before, when marching from St. George's Bay. He states that he was in hospital in August last, with the same complaint, for 16 or 17 days, and that the only other disease he ever had was chancres, four years ago, in Dublin.

On the first day of his admission, a "bruit" was detected at the epigastrium but was never audible afterwards. Firm equable pressure over the epigastric region increased the pain, which was also aggravated by lying either on his back or his side, so that he always adopted, both by day and night, the semi-recumbent attitude. There was pulsation at the epigastrium, and the heart's sounds, though normal, were audible from the right clavicle to the umbilicus, but nowhere particularly loud. The respirations were 40, the dyspnœa and pain being both aggravated at night.

From the first day of his admission he grew steadily worse. He became gradually weaker, his appetite impaired, with occasional vomiting after taking food; his bowels refused to act without an aperient, and his tongue became furred. For the last few days of his life, owing to the irritability of his stomach, wine was the only nourishment he could retain, and an enema the only way of acting on his bowels, while it was necessary to exhibit an opiate every night on account of his sleeplessness, and the greatly exacerbated nocturnal pain.

He died on the morning of December 27th, twenty-one days after his admission, of pure exhaustion, caused by the continued sleeplessness, the severe and constant pain, and the insufficient amount of nourishment retained owing to the gastric irritability.

Post-Mortem Examination.

The thorax and abdomen were examined twenty-four hours after death.

The viscera generally were healthy; the heart was somewhat hypertrophied, but otherwise normal; the spleen was small and contracted; the pancreas, though healthy, was raised from the posterior wall of the abdomen, and pushed forward by what was found to be an aneurism of the cœliac axis.

This tumour, which had been originally a true aneurism, had burst on its upper and anterior aspect, evidently some time before the fatal event, and a large quantity of blood had been extravasated into the surrounding areolar tissue.

The true aneurismal sac, which was formed of the diseased and dilated cœliac axis, was about the size of a turkey's egg. It gave off at its under and anterior aspect the three cœliac branches, the hepatic, the gastric, and the splenic; and its communication with the aorta was dilated into an opening about three-quarters of an inch in diameter. The aperture, by which the sac communicated with the areolar tissue, was irregularly circular, about one and a-half inches in diameter, and situated on the upper and anterior surface of the tumour, its lower border being about half an inch above the common point of origin of the three cœliac branches, whilst its upper and posterior border was about two inches from the commencement of the cœliac axis. At the edge of this opening the ruptured inner coat of the vessel hung in smooth cartilage-like shreds into the interior of the cavity, the whole inner surface of the sac being divided into sulci and anfractuosities by similar cartilage-like patches of degeneration, which covered its internal coat. This opening must have required some length of time to attain such dimensions; and during that period more and more blood must have been finding its way into the surrounding areolar tissue. The extravasated blood, accordingly, dark and coagulated like black-currant jelly, completely surrounded the sac on all sides, except at its under-surface between the aorta and the common origin of the three cœliac branches, and formed, along with the aneurism itself, a tumour about the size of both kidneys, occupying the epigastrium. Besides this, the extravasated blood had forced its way through the æsophageal orifice of the diaphragm, and behind that tube into the posterior mediastinum, the whole of which space, as far as the bifurcation of the trachea, was occupied by a large elongated black clot, which completely covered the aorta, and through the whole of that extent enclosed the æsophagus in its thickness.

These two, epigastric and mediastinal, formed the principal masses of the extravasated blood; but wherever it could find the areolar tissue continuous, this fluid, both in the abdominal and thoracic cavities, had dissected its way, separating the viscera from their investing serous membranes by dark thin layers. Thus a black stratum extended over the stomach beneath its serous covering as far as one and a-half inches from its lesser curvature. Similar strata separated the peritoneum from the diaphragm posteriorly, and insinuated themselves into the folds of the posterior ligaments of the liver. In the thorax too, the blood had found its way between the diaphragm and the pericardium, and to some extent between the pleura and the lungs. In all these cases the extravasated fluid was found on the adherent surfaces of the serous membranes in the meshes of areolar tissue connecting them with their respective viscera, and only where this areolar tissue was immediately continuous with that in which the two principal masses of coagulum lay.

The structural degeneration which had given rise both to the aneurism and the extravasation was not confined to the walls of the cœliac axis. The whole length of the aorta, from its origin in the left ventricle to its bifurcation into the common iliacs, was thickly studded with similar patches of degeneration of various sizes, and irregular distribution; but at no point did that vessel itself appear to have undergone any dilatation, or show any incipient tendency to aneurism.

COMPRESSION IN ANEURISM. THREE CASES.

1.—*Double Popliteal Aneurism.*

Abridged from a Report by Staff Assistant-Surgeon WALTER LEACH, Cork.

PRIVATE J. W., of the 3rd Dragoon Guards, 25 years of age, and of six years service, was admitted into hospital on the 27th November, 1863. He always had good health until the 18th November, 1863, when he began to feel pain from the left hip to the ankle, and on the 21st he discovered a swelling in the hollow behind each knee, giving rise to a throbbing sensation. On examination a pulsating aneurismal tumour was found in each popliteal space, the left one about an inch and a-half in extent, and the right somewhat smaller in size, and weaker in impulse. The heart's action was notably increased, and the abdominal aorta and iliac trunks pulsated vigorously.

From the distinctness of the aortic prolonged murmur, and the "bruit" over the semi-lunar valves of the heart, it was concluded that the arterial lining was in a generally unhealthy state, and probably the seat of atheromatous deposit.

Next day (28th November), circulation was stopped in the left femoral artery, by the application of Carte's compressor. On the 1st December, in consequence of difficulties in retaining that instrument in position, manual was partly substituted for instrumental compression. The alternate pressure was kept up, and by the 8th was found to be more effectual than at first in controlling the pulsation. The heart's action was occasionally very troublesome and notable, but was reduced by drastic purgatives, and digitalis occasionally exhibited. On the 7th January, the tumour ceased entirely to pulsate, but was still hard and rather tender. On the 16th January, the aneurism on the right side was subjected to an exactly similar treatment, and this was continued up to the 20th May. The same satisfactory local result ensued as on the left side; but the long confinement had injured the general health so much as to necessitate invaliding.

In this case the general atheromatous condition of the arterial system precluded interference by operation, and the result of compression under the circumstances must be considered as highly encouraging. A practical deduction from watching the treatment of this case is that direct manual compression is superior to any other that can be applied.

It is believed he, at the same time, had an aneurism of the aorta.

It is so far interesting to note in the ultimate results of this case, that the man's general health was restored in a great degree to its original standard before the appearance of the aneurisms; that the left popliteal aneurism was completely dissipated, and the right reduced to a mere dilatation of the vessel, with very slight pulsation and "bruit" in its course. There is, however, just such a "bruit" over all the larger arterial trunks, indicative, no doubt, of the extensive degeneration before alluded to.

2.—*Femoral Aneurism.*

From a Report by Staff Assistant-Surgeon E. MACGRATH, Dublin.

Private T. M., 36th Regiment, 29 years of age, and of nine years service, was admitted into the Royal Infirmary, Dublin, on the 31st July, 1863, with a large pulsating tumour in the upper part of the left thigh. The tumour was soft and fluctuating, and extended downwards from immediately below Poupart's ligament for about three and a-half inches, and measured about three inches from side to side. The pulsation was extremely violent, and synchronous, or nearly so, with the heart's action. There was a considerable amount of constitutional disturbance, the pulse being full and rapid, and the skin hot and dry. He complains of severe pain along the inner side of thigh and in the groin. The patient, who was a strong, and in other respects, healthy soldier, stated that he was yesterday employed on fatigue duties, and had to lift some heavy weights, which required a considerable amount of muscular exertions; while so employed he experienced no sense of uneasiness, nor was he conscious of having sustained any injury. When relieved from duty, feeling tired, he went to sleep, and slept for about six hours, and on awaking felt a good deal of pain and numbness in the left leg and thigh, and, for the first time, noticed the pulsating tumour in the groin. The pain was so severe that it quite prevented further sleep, and during the greater part of the night he remained walking about through restlessness. He applied for medical assistance in the morning, and, as his regiment was on the eve of departure for India, he was sent for treatment to the Royal Infirmary. On admission, a bandage was applied to the limb below the tumour, and a truss, with a pad of

lint above it, to diminish the force of the circulation; while to the tumour itself ice was kept constantly applied. Anodyne draughts were also administered, and, after some time, he became more easy, and slept pretty well during the night. On the next day (1st August), Carte's large compressor was applied by Staff-Surgeon Todd over the external iliac artery, the pressure being so graduated as almost to stop, but not completely, all pulsation in the tumour. A bandage was applied to the limb below, as before, and opiates freely administered. From this date till the 15th August, pressure was kept up almost unremittingly under the superintendence of Surgeon Todd and Assistant-Surgeon Kirwan, the man bearing the pain and inconvenience caused by the instrument with the greatest possible patience and determination; but two small ulcers having been produced in the integuments by the pressure, it was now obliged to be discontinued. In the meantime, the only change that was produced in the tumour was, that it had become harder and more circumscribed; but the pulsation continued almost as violently as when he was first admitted.

On the 16th August, in consultation, it was decided, that as the tumour was not increasing in size, time should be given for the ulcers in the integuments to heal, and pressure be then tried once more, and if again unattended with success, ligature of the external iliac artery should be had recourse to; meanwhile ice was kept constantly applied to the tumour. On the 7th September, the ulcers in the integuments having partly healed, and the irritation of the skin, having to a great extent subsided, but the tumour itself remaining in almost the same condition as before, pressure was made with the finger over the course of the external iliac artery by relays of orderlies for about five minutes at a time,—that being about the longest period during which each man was able to control the artery. The pressure was kept up for about five hours during the day, under my superintendence (as, owing to Surgeon Todd's departure, the man was now under my care); it completely and easily arrested all pulsation in the tumour. On the 15th September, it appeared evident that the tumour was gradually undergoing solidification, it having become much harder and more circumscribed, and its impulse considerably less. Pressure over the iliac artery with the finger had, in the meantime, been continued for about five hours daily as before. On the morning of the 23rd September, no pulsation in the tumour could be detected; it returned, however, about noon, but was very slight. On the 4th October, about five o'clock P.M., on pressure being discontinued for the day, it was found that all pulsation had ceased in the tumour itself, as also in the femoral popliteal and tibial arteries. For the last day or two, in addition to pressure over the iliac vessel, pressure was also made at the distal side of the tumour, and, as I am inclined to think, with much advantage.

Since the 4th October there has been no return of the pulsation, either in the tumour itself, as in the femoral popliteal or tibial arteries. I have not, however, as yet been able to detect any enlarged collateral vessel; but the limb is of natural temperature, and apparently as well nourished as its fellow.

The tumour is gradually becoming absorbed, and the man is now able to walk about with the assistance of a crutch.

REMARKS.

The case appears to possess several features of interest; in the first place it exhibits, in a very marked degree, the success attending the treatment of aneurism by compression. It also shows the superiority of pressure made by the finger to that made by instruments, the artery by the former method being much more effectually contracted, and there being comparatively but little pain or inconvenience produced. The pressure employed at the distal side of the tumour I also consider worthy of notice, as it appeared to me to have, in this case, accelerated the cure.

3.—*Popliteal Aneurism.*

From the Annual Report of Surgeon-Major ALFRED CROCKER, 2nd Battalion 3rd Regiment.

Private S. W., 22 years of age, a healthy man, of spare habit, was admitted into hospital on the 20th April, 1863, having a pulsating tumour in the left popliteal space, the result of a twist of the leg from treading on a stone. The tumour was of the size of a large egg, and its pulsation was found to be easily controlled by pressure on the femoral, or by flexion at the knee-joint. A Carte's compressor not being procurable, a substitute was made from a 4lb. weight and cork pad, and kept constantly applied, partly by the patient himself, and partly by relays of intelligent attendants, for 55 hours, flexion of the knee, however, being substituted every two hours, for a similar period, to relieve the irksomeness of the weight. The result of this alternate pressure directly over the femoral artery, and flexion at the knee, was perfect consolidation of the tumour. The treatment was continued for twelve hours longer. He was ultimately discharged to light duty almost perfectly well, and afterwards sent home to England for change of air.

DELIGATION OF ARTERIES.—NINE CASES.

1. The *common Carotid Artery*, for Aneurism. (Reported by Dr. GRANT, Surgeon-Major, 84th Regiment.)

PRIVATE T. H., 84th Regiment, 25 years of age, was admitted into hospital on the 1st January, 1864, with a swelling behind the angle of the right jaw, extending upwards towards the lobe of the ear, which he said that he had first observed on the 25th of the previous month. He had suffered much from secondary syphilis, under which he was still labouring; and as he had been treated with mercury both internally, and in the form of vapour bath, the swelling was supposed to be merely glandular, and the case was returned as one of parotitis.

Some days afterwards on examining the tumour, I found a strong jerking pulsation in it, and on applying the stethoscope, a loud whizzing sound was heard, the tumour was firm and solid to the touch, and about the size of a pigeon's egg, but its character was suspicious, and its nature doubtful. Pulsation ceased in it, but without diminution of its size, when the head was thrown well over the shoulder on the affected side; at this time the tumour was about the size of a hen's egg, firm and solid to the touch, and nodulated on the surface; it had a strong jerking pulsation, and when handled gave the impression of a solid body partially grasping and constricting the artery, and having the pulsations of the vessel communicated to it. The diagnosis was rendered obscure and difficult by the co-existence of a swollen condition of the submaxillary and cervical glands. From this date (the early part of February) the tumour increased gradually in size, and extended downwards in the neck, assuming at the same time a more rounded form, and appearing to pulsate more within itself than to have the arterial pulsation communicated, and I therefore, on the 28th March, brought the man, with others whom I proposed for discharge, before a board of Medical Officers, who decided that the case was one of aneurism, and that ligature of the common carotid artery was necessary; that operation was accordingly performed on the 31st March at noon, the patient having been first put under the influence of chloroform.

I was assisted in the operation by the Medical Officers serving in the camp. The chief difficulty in its performance arose from the depth of the artery, and the size of the swelling, which was equal to that of a large orange, and reached so low down in the neck as to leave scarcely an inch and a half of space for the external incision. No embarrassment was felt during the operation from the internal jugular vein which was not even seen; but the possibility of mistaking the *descendens noni* nerve for a fold of the deep fascia was very apparent.

The temperature of the affected side, as indicated by the thermometer, was carefully noted at short intervals up to the sixth day from the operation, but the result was of no physiological significance. No lividity of the surface occurred; but on the evening of the day following the operation, it was observed that there was slight trismus, and the left pupil was dilated; this difference in the size of the pupils, however, the patient said that he had observed for months previously. On the third day there was paralysis of the mouth and tongue, and his articulation was so indistinct that it was difficult to understand what he said; there was also paralysis of the left arm and leg, and of the sphincter muscle of the bladder. The paralysis was confined to the motor branches of the nerves, and was most marked in the left arm, the power of moving which was completely gone, but sensation remained unimpared, and the temperature was natural. On the seventh day there was observable improvement in the state of the mouth, which could be opened more freely; and the tongue protruded further, although still drawn to the right side; power of motion was also a little restored to the left leg, and the urine could be longer retained. The paralytic symptoms continued to diminish in these parts, and were much less perceptible before he died, but the power of moving the left arm was not restored in the slightest degree.

On the tenth day he had a good deal of cough, and the sputa were decidedly purulent. He had had a short cough for some time previously, but as he did not complain of it, my attention was not especially called to it, and I attributed it to pressure of the tumour upon the larynx and to the relaxed condition of the velum and uvula from the venereal affection; the sputa continued purulent and copious until his death. On the 16th April he complained of pain in the region of the heart, and on applying the stethoscope, the sounds of that organ were found healthy, but a distinct metallic tinkling, indicating effusion into the left pleura, was heard. From this time the symptoms of hectic increased, and it was obvious that there was extensive disease of the lung; but the aneurism decreased steadily in size, all pulsation having ceased in it since the ligature had been applied, and it had a firm solid feeling to the touch. The ligature separated on the 23rd day, the wound healed, and the cicatrix appeared firm and healthy. From the state of the lungs I could not anticipate any but a fatal termination, but I had hoped that the operation would have been so far successful as to have averted death from hæmorrhage. On the 2nd May, however, secondary hæmorrhage occurred, a jet of blood suddenly spurting from the neck while the patient was lying quite at rest; the bleeding was promptly restrained, and kept under control for twenty-four hours by a plug in the wound, on introducing which pus was observed to escape with the blood, there was no second gush of blood, but he died exhausted twenty-four hours after the occurrence of the first. A most remarkable lividity of the left side of the face, bounded exactly by the mesial line, was observed a short time before he died, and disappeared as the body cooled. Death occurred on the 33rd day after the operation, the 10th after the separation of ligature.

Post mortem appearances after 24 *hours.*—The body was much emaciated. The head not examined. On dissecting back the integument, superficial fascia, and platysma muscle, an abscess capable of containing rather more than an ounce of fluid, and surrounding the artery above and below the seat of ligature, was exposed. This abscess was open externally to the extent of the cicatrix, which had been completely broken down in plugging the vessel; its cavity was occupied by the different pieces of the sponge tent and by clots of blood; and, posteriorly, it communicated with the artery below the ligature by an ulcerated opening perforating the arterial coats through which an ordinary-sized silver probe could be readily passed, and from which the bleeding had taken place. It was found that the ligature had been applied little more than half an inch above the bifurcation of the innominate artery, and that consequently a very imperfect, and but partially organised coagulum, had been formed. On dissecting upwards, the cervical glands were found enlarged, and firmly adherent to the sac, and on removing them, the artery was seen to run along the outer and posterior aspect of the sac from its lowest part to its origin at the point of bifurcation into the external and internal carotid. It will thus be perceived that the artery—of its normal calibre, or but very slightly dilated,—lay upon the aneurismal sac and adherent to it internally, while externally it was covered by a mass of enlarged and adherent glandular tissue; so that the description of a solid body grasping the artery, and having its pulsation communicated, which was given of the case in its earlier stage, was in exact accordance with the state of the parts. The artery was found filled with a firm clot from above the ligature to its bifurcation, and there was a good deal of fibrinous deposit on its inner coat close to the constricted part.

The right lung was healthy, but the left was completely disorganized, and the thoracic cavity on that side contained about a quart of pus; the liver was rather enlarged, but the abdominal muscles were otherwise healthy.

Although in this case the operation had little chance of being successful, from the cachetic state of the patient and the size of the tumour which rendered it necessary to apply the ligature so low down; there was no doubt that life was prolonged by it. There is no reason to suppose that the paralysis depended upon structural disease of the brain, because it did not exist before the operation, but supervened almost immediately upon it, and diminished as the circulation became partially restored. It probably would have been less marked, or altogether absent, if the patient had been in more robust health.

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2. *The Femoral Artery*, for Popliteal Aneurism. (Abridged from a Report by Dr. Baxter, Surgeon, 12th Lancers.)

Private H. F., 12th Lancers, 29 years of age, a man of general good health and temperate habits, was admitted into hospital on 7th July, 1863, with a painful pulsating tumour in the left popliteal space. His leg had that morning on parade received a violent wrench outwards and backwards.

From his admission up to the 18th of October following, compression of the femoral by Carte's compressor, and flexion at the knee joint were fully and fairly tried, and with no success. The tumour now had arrived at such a condition, and attained to such dimensions (22½ inches in circumference), that it was determined to tie the femoral below the origin of the profunda. Under the influence of chloroform, an incision three and a half inches in length was made in the space described as "Scarpa's triangle," and the artery securely deligated. The limb was swathed in cotton, and the patient felt easy and composed. The ligature came away on the sixteenth day after the operation, and up to the 18th February following every symptom was favourable, the circumference of the tumour becoming much less, and the general health remarkably restored. On the latter date as he was having the cold douche applied to his knee, he was suddenly seized with shivering, soon became very feverish, and the knee and surrounding absorbents became increasingly swollen and painful. The pyrexia disappeared under appropriate treatment, but the tumour was found to be suppurating. Fluctuation was early discoverable, and the leg, below the pressure of this mass of matter, began to slough and be disorganized. Some pints of pus were drawn from the tumour and it continued to discharge, while the articular cartilages were also involved; as his general health began to suffer, it was determined to remove the limb, which was accordingly done on the 22nd March, by the circular method. Requiring much support and careful nursing, he gradually got over the shock of the operation; on the 24th day after, the last ligature was removed; and he soon regained excellent health.

The amputated limb was examined and found the seat of most extensive sphacelus. The femoral was found much diminished in calibre, especially where it entered the sac. A diffused mass of fibrine and pus filled the site of the aneurism. The collateral arterial branches were much increased in size.

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3. *The Femoral Artery*, for Traumatic Femoral Aneurism. (By Frederick Robinson, M.D., Surgeon Scots Fusilier Guards.)

The subject of this notice, a fine healthy young man, aged 24, a corporal in the regiment, was admitted into hospital on the morning of August 25th,

1863. Whilst larking in the surgery with the hospital corporal, who was at the time engaged in cleaning an amputating knife, the former received a stab. The site of the injury was in the course of the great vessel, and about two inches below Poupart's ligament. The poor fellow was stated to have lost a considerable quantity of blood, and to have fainted before his unfortunate comrade, recovering his presence of mind, applied a compress of lint, and sent for a medical officer. The latter, Assistant-Surgeon Baker, finding the hemorrhage completely arrested, did not disturb the dressings. It would appear that in the evening there was considerable tumefaction in the vicinity of the wound, but no oozing of blood from beneath the bandages. On the morning of the 3rd of September the outer dressings were removed, and a wound corresponding to the size of the knife, and containing a plug of lint, became visible. The adjacent parts were somewhat inflamed and tumefied. The plug of lint was allowed to remain, and a wet bandage applied. No hemorrhage experienced. On my assuming the charge of the man on the morning of the 10th, and dressing the wound, its condition was as follows:—There was an oval ulcer about the size of a crown, containing in its centre a clot, apparently of recent formation. Healthy purulent discharge, tinged with blood, was secreted, and a good deal of thickening and redness of tissues adjacent to the wound was present; the results of inflammatory action set up in the locality. Strong pulsation was imparted to the hand when placed over the ulcer, and a loud clear bruit was audible. There was diffused swelling, apparently blood in a fluid state. The general state of the patient was very satisfactory; no pyrexia, but some sleeplessness complained of.

Ordered water-dressing and a morphia pill at bed time. On the 8th the report in the case-book was as follows:

"There has been no hemorrhage—the clot plugging up the centre of the ulcer has dissolved, and being discharged, the latter looks healthy, and the swollen and inflamed tissues adjacent have subsided. The bruit, however, has increased in intensity—loud and characteristic. No numbness or coldness of extremity. General state of health satisfactory. Sleeps well without an opiate. No defined aneurismal tumour; contour of the limb almost natural, a little fuller perhaps than the other thigh; pressure to the artery above the pubis, by means of Signorini tourniquet, gradually tightened."

He continued to progress satisfactorily, as regards the state of the ulcer and his general health, until the morning of the 18th. During this period, however, the current of blood into the aneurism could not be materially controlled by pressure—the contents of the sac remaining evidently fluid for the most part—and the swelling assuming a more convex form. The ulcer had contracted to the size of a sixpence. On the morning referred to, at about 8 o'clock, whilst reaching over the side of the bed, the patient experienced slight hemorrhage from the ulcer. On examination soon after, a small dark clot, the size of a pea, was found plugging up the centre of the ulcer. A very strong impulse imparted to the hand when placed over the locality.

No further hemorrhage took place. but the edges of the ulcer became everted and flabby, and the, aneurismal sac gradually increased in size—extending inwards. On the morning of the 20th, pressure having been fairly tried and proved quite ineffectual in causing coagulation, it was determined to lay open the sac, and ligature the artery above and below the seat of injury. At 3 P.M. the patient being placed under the influence of chloroform, an incision was made through the centre of the aneurism, on a line with the course of the artery. A dark coagulum, the size of a walnut, plugged up the small ulcer, and on its removal, profuse artery hemorrhage resulted. This was absolutely uncontrollable by pressure over the pubis—though most effectually rendered. The main artery bound down and imbedded in tissues, thickened considerably by adhesive inflammation, was found on the inner side of a large cul-de-sac capable of containing the closed fist, and from a large wound in the vessel the blood welled forth to a very serious extent. The difficulty in the way of the operator was necessarily considerable,* The hemorrhage being of alarming extent (threatening an immediately fatal issue), and pressure above the site being wholly ineffectual, it was judged expedient to enlarge the wound upwards, and secure the common femoral just below Poupart's ligament. This proceeding was adopted, but it failed to diminish materially the loss of blood.

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* The writer feels under great obligations to Dr. Campbell, Prof. of Surgery in McGill College, and to Assistant-Surgeons Turner, Scots Fusilier Guards, and Lawrence, Grenadier Guards, for their valuable assistance during this operation.

Only by pressing firmly two fingers over the lesion in the artery, could the hemorrhage be somewhat controlled. After some delay, the hand of an assistant being thus placed, the vessel was dissected out, and the ligature placed above and below its lesion. This was evidently longitudinal, and as far as could be judged, more than an inch in length. The patient was greatly exhausted, and stimulants were freely given. Three sutures were placed in the wound, the sides were drawn together by adhesive plaister, and a wet lint applied to the surface; there was no bleeding subsequently. No difference in the temperature of the affected limb. A flannel roller was applied from the foot upwards. Some sickness and vomiting occurred within the first hour or so, but the nausea soon subsided. An opiate was ordered with good effect in the evening, and effervescing draughts of carb. of ammonia with hydrocyanic acid, with a little beef tea and jelly, freely administered at intervals. His progress from this time to the 24th was most satisfactory. The wound, at first rather foul and sloughy, cleansed, and rapidly took on healthy action, and the general condition of the patient became as favourable as could be desired. On the 24th, after passing a good night, he complained of a feeling of "soreness" in the right *iliac* fossa. Very little, if any, tenderness on pressure was experienced there, but some enlarged glands were felt in the locality, and the uneasiness was referred to them by the patient, rather than to a position more deep seated. The discharge on this day was, as it had been, thick and healthy. The wound, on the whole, was healthy; the bottom of it was, however, still foul, though fast cleaning, each day granulations springing up. The same feeling of soreness and stiffness was casually mentioned by the patient as being experienced down the adductors and the muscles of the leg. No swelling of the limb. The temperature had continued good, but no pulsation in the tibial arteries could be discovered then or subsequently, up to the date of the man's death—the heat, however, remaining of normal standard. He was ordered dec. of bark, with liq. ammonia acet. He slept well, but awoke about 4 o'clock on the 25th, experiencing a severe shooting pain, extending from the testicle to the right hypochondrium, and also across the latter. There were no rigors or pyrexial symptoms.

Ordered poppy fomentations. The dressing to the wound from the outset was wet lint, and subsequently in addition chloric lotion. Decoction of bark thrice a day, wine, and nourishment in large quantity.

Report of 27th. The pain disappeared after the fomentations, and he continued free from abdominal uneasiness. The symptoms, both as regard his general state and the wound, very favourable on the whole, In the case book, however, it was noted that the respiration was rather more frequent than normal, and accompanied by occasional sighing, as if from despondency on the part of the patient, who nevertheless spoke confidently as to his own amendment. The countenance palid, and somewhat anxious in expression.

On the 29th the wound was making very fast progress, the ash-coloured portion at the bottom almost replaced entirely by healthy granulations. A little mucous sputa tinged with blood was expectorated on the 2nd of October, and the respiration at the base of right lung was a little weak. The gums being blanched, and rather spongy, in the absence of more decided stethoscopic evidence of disease, it was supposed, from the man's explanation of the occurrence, that the bleeding might have come from the mouth. On this day he remarked that he felt pain, on coughing, in the region of the right spermatic cord. The appetite was indifferent; citrate of quinine and iron was substituted for the decoction of bark. He had been able previously to dispense with the opiate at night.

Oct. 3rd. Report stated that he passed an indifferent night, owing to a troublesome cough. Scanty mucous sputa; perspired somewhat; bowels a little loose; wound continues to heal favourably. Ordered cod liver oil, two drachms twice a day, and an antispasmodic mixture containing prussic acid.

On the 4th the ligature from the lower end of the artery came away.

On the 8th the report stated that his progress during the previous days had not been satisfactory.

He had not experienced rigors, but the pulse was accelerated at night, and there was decided hectic, not, however, of an aggravated form, followed by copious perspiration. Some tendency to diarrhœa, but easily checked; the respiration somewhat tubular at the apices of lungs, dulness of lower two thirds of right side, and absence of respiratory murmur there; large moist crepitating râles in both lungs. Sputa of the same character as before, and scanty. Appetite very poor, but he takes nourishment in sufficient quantity; tongue *perfectly clean and healthy in appearance.* No abdominal or inguinal pain. Pulse weak and frequent. On the evening of the 11th he had a distinct rigor, not long continued however; he had previously slept well. The last ligature came away this day; ulcer closing up. In every other respect his condition remained the same as at the previous date. Ordered syrup iodide of iron, a drachm twice a-day.

On the 14th no change of importance was noticed, except that a chronic abscess the size of an egg had formed on the sacrum, and had been opened.

On the 16th, report says, "another rigor experienced, lasting half an hour." In other respects as before. Chest symptoms much as before, not urgent. Wound rather palid, and limb somewhat œdematous. From this date until his decease, on the morning of the 24th October, he became gradually worse, the more prominent symptom being severe rigors followed by profuse perspiration and consequent exhaustion. The chest symptoms were not urgent, and owing to the great distress occasioned him when the shoulders were raised for the purpose of applying the stethoscope posteriorly, examination of this region was not made so frequently as could be desired. There were loud crepitant râles (pretty general), on the 19th, the dullness having for the most part disappeared at the base of the lungs; and on the 21st some friction sounds were audible posteriorly on both sides. The ulcer then took on unhealthy action, the granulations became pale and flabby, with dark sanious discharge. At the time of decease the sore was only about the size of a florin. The lower extremity became pale, œdematous, somewhat swollen and hard. The tongue retained its healthy appearance up to the 23rd, when it became brown and dry. There was very little diarrhœa. He expired, on the morning of the 24th October without suffering, rather suddenly while an orderly was assisting to arrange his clothes.

His strength had been supported and life prolonged by large quantities of nourishment—beef tea, jelly, and wine, together with diffusible stimulants, acids, and opium,—which he took very regularly, notwithstanding an absence of all desire, latterly, for food.

Post-mortem examination fourteen hours after death.

Both lungs adherent firmly to the parietes of chest by bands of lymph, some of recent formation; no effusion; structure of both lungs friable, portions of them impervious to air; the parenchyma presented appearances generally of recent inflammatory action of low congestive type; other parts of the viscera gorged with serum. Liver considerably enlarged, somewhat congested. Spleen enlarged, congested, very friable. Kidneys normal. Circulatory system healthy; heart firm, polypi in the cavities; the coats of inferior vena cava were much thickened, and the inner surface lined with thick pus. The diseased condition extended down as far as the femoral artery, which, however, did not contain pus, but was plugged up with coagulæ. The artery had been wounded immediately below the profunda, and for space of two inches (between the ligatured portion) the coats had been to a considerable extent absorbed, and the canal obliterated. The cicatrix of the large wound (occasioned by the operation) was firm and sound, an ulcer the size of a sixpence only remaining open.

REMARKS.

This case may be considered an instructive one in several points of view. That so large a wound in a vessel of such importance as the femoral artery should be completely controlled by pressure, and that no secondary hemorrhage took place, must be viewed as very unusual circumstances. Cases have been recorded in which small punctured wounds in the large arteries* have closed up for a longer or a shorter space of time, and nature has effected a complete cure in some instances of lesion of the brachial artery. I am not aware, however, of any instance like the one under notice, and I presume such cases, if met with must be very unfrequent.* The firm pressure employed at first was followed by phlegmonous inflammation of the skin and cellular tissues. Resulting from this general inflammatory action, the incision in the vessel may have in the first instance united. Subsequently yielding to the lateral pressure of the column of blood, the wound would re-open, and the ordinary evidences of false aneurism present themselves. Even then, however, the growth in size was much slower, and, up to the period of operation, the magnitude of the tumour much less than might be anticipated. Certainly, however, it extended inwards to a considerable distance, absorbing the areolar tissues and glands.

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* A case of wound of the abdominal aorta thus spontaneously closing up is on record.

1st. The insidious progress of blood-poisoning is well illustrated in the present case. This contingency was looked for from the outset, the wound being of large size, deep, in a locality where the absorbents are especially active, and, moreover, the exhausted and debilitated state of the man predisposed him much to such disastrous sequence. Every preventive measure, therefore, as regards air, cleanliness of the wound, and diet was carefully observed.

2nd. The favourable progress of the wound, after the symptoms pointed to absorption of pus, is rather a noticeable feature in the case. Thus the operation was performed on the 20th September, and the symptoms of phlebitis set in on the 25th. Then an interval of apparent immunity from unfavourable symptoms is succeeded by evidences of insidious disease in the lung tissue and pleura, the ulcer meanwhile advancing most satisfactorily.

Not until October 11th were distinct rigors observable, but yet the ulcer continued to heal as favourably as could be desired up to the 16th. Thus only a few days before the poor fellow's death did the ulcer show evidence of the *diseased* state of the blood.

3. The healthy state of the tongue, absence of thirst, and even at the last, little tendency to diarrhœa, were rather unusual features in the case; the characteristic, dry, red state of the former organ being absent throughout.

4. Lastly, may we not derive some practical lesson as to the mode of treatment in such cases? The description of the catastrophe, the profuse hemorrhage and subsequent syncope, would point indubitably at the time of occurrence to a lesion of either the femoral or profunda artery, but the bleeding had ceased, and was entirely controlled before the man was seen by my colleague.

Under such circumstances should the dressing be removed, the vessel sought for and secured by ligature above and below the wound; or should the curative process of nature, so far advancing favourably, be afforded further trial?

No one, I presume, would assert that this latter course is at variance with the recognized rules and principles of surgery relative to wounded vessels, and, as I have remarked, cases, some of recent occurrence, give weight to such practice. My own views, however, are decidedly in favour of the first-named mode of proceeding, and that, as a general rule, the employment of pressure as a curative means should be limited to vessels of no larger capacity than the radial and ulnar arteries.

The subject of this case was evidently of vigorous constitution, and the length of the interval elapsing after the secondary operation, and the almost entire cicatrization of the large wound, before decease, showed the reparative efforts his system was capable of putting forth during the long protracted struggle between life and death.

4. *The Anterior Tibial.* (Abridged from a Report by Staff-Surgeon-Major MULLINS, St. Helena).

Captain P., of the St. Helena Regiment, 50 years of age, and of twenty years' tropical service, of active and temperate habits, was riding on the 25th February, 1863, when his horse reared and he fell backwards, fracturing both bones at the lower third of the right leg. He was seen at once, the leg placed in M'Intyre's splint, and he was removed to his house on a stretcher. There was considerable pain, swelling, and ecchymosis below the knee, with intolerance of all appliances of adjustment. Cold lotion was applied externally, and a dose of morphia administered. On the 27th, the swelling had increased, the skin become tense, and a small vesicle appeared on the inner side of the leg, just opposite to the fracture. The limb was cool, and there was increase of discoloration. Its temperature was natural, and the skin warm and moist. The tongue was coated, and the pulse 98. Tepid poultices were now substituted for the cold lotion.

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* I have not the opportunity of searching the records of cases of this nature.

About midnight following, more bullæ were found forming on the inner side of the leg, and the first one became much increased in size. A further search revealed a distinct pulsation and bruit about the middle of the leg, synchronous with the heart's action, and indicative of an aneurism, probably traumatic.

Next day (the 28th) the marks of aneurism were more distinct. The pulse had risen to 102. There was no change in the temperature or appearance of the limb, and no rigor.

The pulsation and bruit were controlled by pressure on the femoral and anterior tibial, above the injury. The clear, loud character of the sound and impulse and the swelling of the limb led to the conclusion that it was a circumscribed traumatic aneurism. It was determined to contrive a compressor to act on the anterior tibial as it passes through the interosseous membrane. Its application was found to be successful in arresting all bruit and pulsation, but, as it could not be borne by the patient, it was resolved to tie the anterior tibial at once.

On the 2nd of March, accordingly, under chloroform, an incision five inches long, commencing where the bruit was loudest at the upper part of the middle third of the leg, was made down to the fascia, and then enlarged to allow access to the aneurismal tumour, which was exposed, and found to be of the size of a walnut, but a little elongated. The vessel was tied about an inch above the sac, and, as there was much laceration below, it was also tied an inch under the aneurism, the incision being prolonged to the extent, altogether, of eight inches. The edges were brought together by stitches and plaister, and the limb laid in M'Intyre's splint. During the proceeding there had been but a trifling hæmorrhage. Although the operation was followed by considerable nervous irritability, and the wound gaped a good deal, yet, by the aid of morphia and brandy and attention to diet and rest, he recovered slowly from its immediate effects. He was annoyed by the appearance of several small abscesses, and the bone became denuded of periostium for nearly an inch above the seat of fracture. This was followed by tedious exfoliation, and it was not until the following June that the reparative process set in uninterruptedly, and the bones began to unite. By the end of the year he had recovered the use of the limb, and walked tolerably well with a stick. The action of the extensors were somewhat impaired by the sloughing process, and the limb was found to be a quarter of an inch shorter.

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5. *The External Iliac Artery,* for Sloughing of the Common Femoral. (By G. Banister, Esq., F.R.C.S., Surgeon, R.A.)

Private H. T., of the 3rd Battalion Rifle Brigade, who was transferred to the hospital, 104th Regiment, January 18, 1863, a healthy-looking Englishman, aged 24 years, four years service, two of which have been in India; was admitted December 13, 1862, into the regimental hospital with a large irregular sore on the inner surface of the prepuce, the edges of which were very much indurated. There was also a large bubo in the right groin, which had opened in three places by small apertures. The parts around were in a most unhealthy state. The bubo was opened longitudinally, and a quantity of sanious fluid escaped, and one of the femoral glands was nearly detached by sloughing. He had concealed his disease for a fortnight, and was made prisoner in consequence, but had since been released.

On the 20th December, one of the glands came away. The parts appeared in a most unhealthy condition, and, on January 1, 1863, caustic potash was applied, and afterwards poultices. On the 4th January, the slough was separating nicely, and on the 7th the wound appeared more healthy. He suffered no pain, and the sore on the penis had also improved. Zinc lotion was applied. On the 11th, the state of the parts was not so good, and caustic potash was again applied, and on the 13th the appearance of the parts had slightly improved. On the 15th, he told me he had had considerable trickling of blood during the night, and I found him with a bandage and compress on the wound, which I did not remove. Between 12 and 1 in the day, I was sent for, as hæmorrhage of a serious nature had ensued, and on removing the bandage, found either the femoral had given way, or a large branch of it, and the loss of blood had been very considerable.

About 2 P.M. January 15, I was called, in consultation with my assistant-surgeons, Drs. Cookson and Cameron, to see the patient, as, about an hour before, sudden arterial hæmorrhage had burst forth from a large sloughy cavity in the upper and anterior part of the right thigh, just below Poupart's ligament, and in the situation of the common femoral vessels. Compression by pledgets of lint, compresses and bandages, was being sustained, and no hæmorrhage had occurred for half an hour. The pulse was rapid and weak, the countenance blanched, and the expression anxious. In the opinion of Dr. Baley, a large arterial branch had given way in the mass of slough at the bottom of the wound, but he had been unable to determine the exact origin. As the bleeding had been arrested for some time, it was hoped compression might still avail, and nothing more was done except placing over the bandages a bladder containing ice.

I saw the patient again at 5 P.M. No more hæmorrhage had taken place; the collapse was less, and all seemed to be going on favourably. At 9 P.M., accompanied by Dr. Cameron, I again visited the case, and was informed by Dr. Baley a messenger had been dispatched for me, as the bandages were saturated with blood, and the pulse gave evidence of increasing exhaustion. Taking into consideration the immediate necessity for resorting to more certain means of preventing further hæmorrhage than that afforded by pressure, and the great probability that, instead of a branch, the main artery of the limb had sloughed, I strongly recommended instant deligation of the external iliac artery, for I feared an attempt to secure the bleeding openings in the sloughy wound would prove abortive, and if the coats of the vessels—a very probable contingency—should be found to be diseased, ligatures would not afford sufficient security, even if they could be applied.

As this advice entirely coincided with the opinions of Drs. Baley and Cameron, it was acted on at once. Having been requested to operate, I thought I would first make certain of the rupture of the common femoral, and so loosed the bandages and compresses, and freed the wound of coagula. So great a gush of arterial blood immediately burst forth I desisted from the attempt, bound up the wound, and commenced the operation. An incision of the usual length was made through the skin and superficial fascia, between the anterior superior spinous process of the ilium and the abdominal ring. This exposed the tendon of the external oblique muscle, which was divided on a director to the same extent, and such of the fibres of the internal oblique and transversalis as were in the way were similarly divided. This exposed the fascia transversalis, which was elevated at the inner extremity of the incision, cautiously opened, and then divided on a director. The peritoneum was then carefully separated from its attachments, and the external iliac artery could be readily felt pulsating on the inner margin of the psoas magnus. The investing sheath of the vessels derived from the iliac fascia was so tough and dense that the aneurism needle could not penetrate it without using more force than was desirable. An opening was therefore scratched with a scalpel, and the needle then passed easily from within outwards, and embraced the vessels. The fascia was apparently very adherent to the artery, for it was found necessary to divide it on the outer side of the vessel, and very little inconvenience was experienced in doing so, as it was raised on the point of the ligature needle and easily scratched through. The ligature was then secured, and the edges of the wound were brought together by sutures and sticking-plaister. Fresh dressings were lightly applied to the wound in the thigh, the limb was rolled in thick flannel, and a full dose of opium was prescribed.

Jan. 16.—The patient's condition is most favourable. Passed a good night; pulse 110 and firmer; less anxiety of countenance; no oozing whatever from the groin; limb rather colder than natural, especially in the toes and foot. There is some œdema of the foot; and Dr. Baley states he has observed this during the last few days. Wound in the thigh dressed with warm copaiba. Capiat opii gr. iij. 4 tis horis.

Vespere.—Going on well.

Jan. 17.—Passed a good night; pulse 98; no anxiety of countenance; tongue moist; says he has enjoyed his food more than for the last two months. Rept: opii gr. ij. 6 tis horis.

Jan. 18.—Doing well. Some distension of the abdomen from flatus and desire to go to stool. Wound of operation healthy; that in the thigh less sloughy, and discharge less offensive; pulse 98. Copaiba dressing to bottom of wound, and lint soaked in Condy's fluid over all. Rept: opii, gr. ij. b. d.

Jan. 19.—Passed a good night. Took a small dose of castor-oil early in the morning, and at noon three or four stools were passed with great relief. Is in excellent spirits, and the wound in the thigh is assuming a healthier appearance. Rept: opii, gr. ij., horâ somni.

Jan. 20.—Going on most favourably; discharge from thigh less offensive, and, from some parts, it is tolerably healthy, and some sloughs are separating. An inch and a-half of the inner extremity of the operation-wound has firmly united. The sutures were removed on the 18th; passed a good night; tongue clean and moist; pulse 98. The temperature of the limb is normal, or, if any thing, a little higher than that of the opposite side. Abdomen lax, and quite free from pain, even in the neighbourhood of the wound. Rept: opii gr. ij., horâ somni.

Jan. 21.—*Mane.* Going on, apparently, exceedingly well. Some sloughs which had nearly separated from the bottom of the wound were removed. No bleeding, or even oozing, from any vessel. Secretion from the general surface of the wound much less offensive, and decidedly more healthy.

9 A.M.—Had an inclination to stool, and exerted himself too much in an endeavour to sit up.

10.30 A.M.—Sudden hæmorrhage from the wound in the thigh. I had but an instant before left the hospital, and was therefore in immediate attendance. I maintained pressure over the course of the superficial femoral artery, freed the wound from coagula, and ascertained, without difficulty, that the hæmorrhage issued from the distal extremity of the vessel. Drs. Cookson and Cameron quickly joined me, and confiding the compression of the artery to one of them, I made an incision, about three inches in length, downwards in the direction of the vessel, and, after difficult dissection in altered and sloughy textures, exposed the artery, and passed a ligature around the termination of the common femoral, the open extremity of which was plainly discernible; but, as the tunics were evidently diseased, I did not like to trust to this, and therefore extended the incision downwards, and deligated the superficial femoral an inch and a-half lower down, where the artery rests on the adductor longus, and where the tunics were found to be apparently healthy. This, however, necessitated placing a ligament on the profunda, and this was accomplished without any great difficulty in the first part of the operation, and, as the external circumflex was found to be destroyed, its proximal end was secured, and unfortunately its distal extremity could not be found.

All this was not accomplished without great difficulty, for the parts above were sloughy and almost unrecognizable, and lower down adhesive inflammation had condensed and matted together all the neighbouring textures, so that nothing retracted, and every step of the proceeding had to be carefully and slowly effected by dissection. This operation disclosed a most unfavourable condition of parts in this most important situation. The whole of the common femoral artery, except the very extremity, which was so diseased as to break down under a ligature; the origin of the external circumflex, the common femoral vein, and some inches of the inner saphena, together with a large portion of the pectincus muscle, fascialata, and an immense amount of areolar texture had been completely destroyed, and the finger, passed to the bottom of the wound, rested on sloughs and the cellular membrane close to the capsular ligament of the hip-joint. There was also several deep-seated lymphatic glands much enlarged and in different stages of diffluence and disintegration. This large cavity reached upwards to Poupart's ligament, where the femoral opening was covered with a slough; but, as no bleeding whatever had come from this point after the deligation of the external iliac, it was hoped a clot had formed below the ligature, and shut off any blood which might flow into it from the anastomoses of the circumflex ilii and epigastric arteries.

Further hæmorrhage was completely arrested by these proceedings, and it is satisfactory to state there was very little blood lost after the first great gush, so ably was digital compression of the superficial femoral artery maintained by Drs. Cookson and Cameron. The patient was not much depressed or exhausted, and I resumed the previous treatment by opium. The lower part of the incision was brought together by sutures and sticking-plaister, and the leg bound up in cotton and flannel rollers.

Vespere.—Makes no complaint, but is inclined to be restless. Opii gr. iij, statim et rept: si opus fuerit.

Jan. 22.—Passed a quiet night; pulse 108; general appearances satisfactory. Wound in the thigh sloughy at the bottom and outer part, and contains some small coagula. The temperature of the limb nearly natural, but there is some diminution of sensation, especially in the foot. Wound dressed with warm copaiba and Condy. Rept: opii gr. iij., nocte.

Jan. 23.—Pulse 120. Passed a restless night, but, towards morning, had a calm and refreshing sleep. Complains of a lancinating pain in the limb from the knee downwards. Temperature of the thigh and leg natural. Some coldness of the great toe and loss of sensation; more general œdema of the foot and limb. On removing the dressings from the wound the large cavity was found filled with serous fluid slightly tinged with blood, evidently the effect of gravitation from the œdematous cellular membrane of the lower part of the thigh, for, on account of pillows being placed under the knee, and the sinking of the bed, the groin is made the most depending part. Rept: opii gr. iij., p. s. n.

Jan. 24.—Passed a good night; took nine grains of opium yesterday; pulse 120; temperature of the limb, with the exception of the big toe, almost natural.

11 A.M.—Sudden hæmorrhage from the wound. I was not, unfortunately, present, and did not arrive till half an hour afterwards; and, although Mr. Young, the assistant apothecary in attendance, immediately plugged the wound and kept up digital compression in the course of the superficial femoral, the bleeding was not arrested, and on my arrival, the patient was in the greatest immediate danger from syncope.

I was inclined to think at first, from the size of the clot adherent to the outside of the hip, and the deadly pallor, that the hæmorrhage was from the proximal extremity of the external iliac; and I decided, if the condition of the patient should admit of it, to amputate at the hip-joint, after commanding and securing the bleeding vessel. The hip-joint was selected in preference to a point lower down in the thigh, as it was presumed the limb would be extensively affected with gangrene in the course of the next few days, and it was a matter of great importance to avoid, in the formation of the flaps, parts which, in all probability, would subsequently mortify.

The sloughy cavity was immediately cleaned out, and I was delighted to find the bleeding was not from under Poupart's ligament, but from a point under the rectus femoris. This was freely divided by a transverse incision, and I secured what I believe to have been the distal extremity of the external circumflex of the profunda, which had eluded my search on the 21st, when I tied the proximal extremity of the division made in it by sloughing. The vessel was fully as large as the radial artery at its upper part. In the condensed and altered areolar tissue immediately below, the open mouth of another vessel was also secured. It appeared to be a descending branch of the former, and was probably divided by the incision.

The patient remained a long time cold and collapsed, and required frequent stimulants, and the constant application of warm bottles to the axillæ and extremities. He was too depressed for me to think of amputation, and was with difficulty resuscitated.

Vespere.—No recurrence of hæmorrhage. Still under shock. The surface of the body and the temperature of both legs lower than natural. Complains of shooting pains in the affected limb, in which the œdema is increasing. Warmth to be first applied, and the limb to be then bound up in cotton and flannel. Rept: opii, gr. ij.

Jan. 25.—Slept comfortably for some hours during the night. More pain in the right leg, especially about the knee; pulse 130, more distinct; wound dressed, as before, with copaiba, and Condy freely used to prevent effluvia; tongue dry; some thirst. On loosening a part of the flannel bandage, some surface lividity of the limb was observed about the depending and outer part of the knee, and the temperature was considerably lower than in the parts above from that point downward. Gangrene of the whole limb had in fact taken place, and it was a source of great regret that his exhausted condition precluded even a hope that any advantage could result from operative measures.

Vespere.—Lividity of the limb extending downwards; sensation almost lost; complains of pain in the thigh, just below the wound; has recovered from the collapse, but the pulse is very fast and weak. Nourishment and stimulants have been allowed to the fullest extent, and opium, in three-grain doses, has been most useful. The effluvia from the sloughing wound, which has now assumed a most unhealthy appearance, are completely destroyed by Condy's fluid, which is a most valuable deodoriser and disinfectant.

Jan. 26.—Passed a good night; pulse still fast; expression natural. The bottom of the wound in the thigh is covered with a continuous slough, discoloured by grumous blood oozing from the situation of the distal extremities of the great vessels. The gangrene was extended upwards to the middle of the thigh and downwards as far as the ancle. Leg and foot puffy.

Vespere.—Much weaker, but in good spirits. Foot and part of the leg dark-green, and covered with discoloured blebs. Without Condy, the effluvia would be intolerable. By its frequent application the air of the ward is not perceptibly tainted. There is no appearance of a line of demarcation, and the gangrene has involved all the parts from below the middle of the thigh, and the lymphatics are discoloured higher up. Irrespective of local causes, the mortification is favoured by the great depression of the general system. Amputation is now out of the question, and there is a tendency to delirium.

Jan. 27. *Mane.*—Is sinking fast; pulse hardly appreciable; passed a very restless night, and was delirious at times; countenance changed and fearfully depressed; wound pale, with scarcely any secretion; gangrene complete from the middle of the thigh to the toes; large bullæ on the leg and foot.

4 P.M.—Died.

Post-mortem Appearances Seventeen Hours after Death.

The areolar tissue of the body, especially in the face and neck, distended with offensive gas. All the organs fairly healthy. Liver and kidneys pale and flabby. Right leg completely disorganized by gangrene as far up as the lower part of the upper third of the thigh; boundary line faint and irregular. The femoral artery was dissected upwards from Hunter's canal to the lower part of the large sloughy wound, and placed in spirits for subsequent examinasion. The ligatures, which had apparently given way previous to death, separated while the wound was being sponged out, and all the parts in the vicinity were in a diffluent state. The femoral vein in Hunter's canal appeared tolerably healthy, but contained fluid blood in a disorganized state. In the neighbourhood of the wound it was soft and sloughy, and broke away, and its continuity could not be preserved higher up than the middle of the adductor longus. The internal saphena vein could not be traced at all, as it had been destroyed by sloughing. The sheath of the vessels was thickened and matted to the adjoining parts, rendering it very difficult to separate one from the other; and this inconvenience was experienced in the operation recorded on the 21st. The internal saphenous nerve could not be found in the wound, but, by dissecting it from below upwards, it was traced as far as the lower border of the adductor longus.

There was no trace whatever of peritonitis in the situation of the ligature on the external iliac artery; and a more favourable condition of these parts could not have existed for a successful issue to the primary operation. The artery, with the vein, were removed and placed, with the ligature round the former, in spirits, for subsequent examination. The gangrenous limb was dark olive-green, and covered with numerous discoloured bullæ; and, in the course of the superficial vessels, the colour was almost black.

Examination of the Arteries after they had been hardened in Spirit.

The external iliac was found to have been tied at a point nearly equidistant from the bifurcation of the common iliac and the giving off of the epigastric and circumflex ilii. The ligature had nearly ulcerated through, and, had the patient survived, would probably have come away in a few days. The divided extremities of the vessel were cone-shaped. An incision extending throughout the whole length of the vessel, discovered the following appearances:—In the portion above the ligature the clot was firm and extended upwards to the bifurcation of the common iliac, and occupied the whole calibre of the tube, except about four lines at the upper extremity, where it began to taper to a rounded point, leaving a small space between it and the internal coat of the artery. Immediately above this and close to the bifurcation of the common iliac, a transverse elevation of the inner tunic not only protected the clot, but guided the current of blood into the internal iliac, in which it was assisted by a longitudinal corrugation just above, producing a sulcus, which led directly to the same point.

These phenomena are of considerable physiological importance, and are not without their analogue in the heart, where the Eustachian valve has assigned to it an homologous function. The clot immediately above and below the ligature was firmly adherent to the coats of the artery, and apparently becoming organized, that occupying the lower part of the vessel completely filled the calibre of the tube, and extended to within six lines of the lower extremity, which had been destroyed by ulceration, just below Poupart's ligament, and terminated in a rounded point, which was protected by corrugations of the internal coat and the thickened external and middle tunics, which encroached upon the diameter of the vessel, and almost completely closed it. The epigastric and circumflex ilii were patent; but there were little rounded processes of coagula given off from the clot in the external iliac which almost occluded their origin, and precluded the passage of blood through them into the parent vessel.

The external and middle coats of the external iliac became gradually thicker from the middle of the upper clot to the point of ligature where they were about a line and a-half in thickness. Below the ligature they were similarly thickened, and gradually tapered off into the natural size of these tunics, but at the point of origin of the epigastric and circumflex ilii, they began again to increase in size, and, at the ulcerated termination, were at least one-sixth of an inch thick. The opening of this extremity of the vessel, which was immediately under Poupart's ligament, was oblique from below backwards and upwards, and irregular at the edges, which were formed by the external and middle coats. The internal tunic could be seen just within in deep, fringe-like corrugations, almost, if not actually, blocking up the aperture, in which it was assisted by the thickened external and middle coats. The soft parts around this point were condensed and strongly adherent to the sheath and external coat of the artery and vein.

The Femoral Artery.—In the post-mortem examination it is recorded that the ligature which had been placed upon it during life had become involved in the gangrenous action, and came away in sponging out the sloughy cavity. At this point, *i. e.*, where the artery rests on the adductor longus, it was completely disorganized; and a little lower down, where it enters Hunter's cavity, there was found a feeble clot extending almost an inch further down, partly adherent, and filling up about one-third of the diameter of the tube, and, from its lower end there was a thin thread of reddish-tinged fibrine which stretched continuously throughout the remaining portion of the vessel, and undoubtedly contributed towards the arrest of the circulation.

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6. *The External Iliac Artery*, for Sloughing of the Common Femoral. (From a record by Inspector-General A. Stewart, Half-pay, late Surgeon 14th Dragoons, Meerut.)

Private W. P., aged 26, was admitted into hospital on the 24th January, 1851, with gonorrhœa and inflamed bubo in the right groin. Several glands subsequently suppurated and were incised. The lancet wounds did not heal; and, at the end of March, there was a mass of diseased lymphatic glands intersected with sinuses, and covered with discoloured integument; and, although it is not stated there was any marked impairment of constitutional vigour, there was no disposition in the vessels of the part to assume a healthy action. From the 1st to the 10th April, potassa fusa was applied "more than once." On the 13th, there was pain in the right knee, and on the 15th, "pain, swelling, and inflammation in the groin, with arterial hæmorrhage from an opening in that region." The bleeding was restrained for a time, but returned at intervals during the night of the 16th.

On the morning of the 17th, Dr. Stewart's attention was directed to the case, and he thus describes the local condition of the patient:—"The upper part of the thigh was swollen, tense, and shining. Arterial blood escaped from an opening in the groin, which was partly obstructed by coagula. On removal of these coagula, to ascertain more clearly the source and extent of hæmorrhage, arterial blood gushed out profusely, and a cavity the size of an orange was discovered, into which the finger could readily be passed as far back as the trochanter minor."

It was believed the common femoral artery had given way, and deligation of the external iliac artery was at once determined upon. The operation was skilfully performed by Dr. Stewart, without any unnecessary delay, and the patient went on most favourably till the 21st, when the foot of the affected limb was found to be cold and livid. On the 28th, gangrene had extended up to the middle of the calf, and amputation, by anterior-posterior flaps, was performed on that day at the middle of the thigh. On the 2nd May, the dressings on the inner side of the stump were found covered with dark-coloured offensive matter; and in the course of the next few days, about an inch of the anterior flap sloughed away, involving, however, only the thickness of the skin. Healthy granulations sprung up on the detachment of the slough, and everything tended to a favourable result; but, on the 10th of May, irritative fever supervened, the discharge dried up in the stump and suppurating cavity in the groin, and the patient rapidly sank and died, at 9 A.M. on the 11th May, from pyæmia. The ligature of the external iliac came away on the twenty-third day.

The *sectio cadaveris* disclosed the following condition of the parts in the groin:—

"About Poupart's ligament the artery (external iliac), together with the vein, ended abruptly in a dark, discoloured trunk, obliterated by coagula. A portion of the femoral artery, including the point of bifurcation into superficial and profunda, was, together with the corresponding portion of the femoral vein, entirely destroyed. On dissecting the superficial femoral and profunda arteries below, and following them upwards, both were found to terminate abruptly in separate trunks. The calibre of the superficial branch, near its end, was obliterated, and the vein which accompanied it was filled, throughout its whole course, by firm coagula. The upper end of the trunk of the profunda thus traced from below was not so completely closed. The coats of the superficial and deep femoral arteries were healthy."

The flaps of the stump were united to a considerable extent on each side. There was extensive dysenteric ulceration in the cœcum and colon, and the liver was enlarged and filled with numerous abscesses. All the other viscera were healthy.

The wound for tying the external iliac artery was entirely healed. The vessel was found to have been deligated an inch and three-quarters below the point of the bifurcation of the common into external and internal iliacs. At the point of ligature it was divided, and each extremity was occupied by a fibrinous clot. The one in the upper portion extended within a little distance of the point of bifurcation.

Dr. Stewart remarks:—"Referring to the appearances found on dissection in this case, it would appear that a chief obstacle to the establishment of collateral circulation, and, consequently, a cause of mortification in the limb, after deligation of the artery, was the serious extent to which the venous trunks in the upper part were involved. The femoral vein, as has been stated, was found to be not only obliterated for a considerable space, but at one point, together with the artery, entirely destroyed, and the ends separated for a distance of at least three-quarters of an inch. The veins which accompanied the superficial and profunda arteries were, in like manner, obliterated by firm coagula; so that any venous circulation existing in the limb from the time of the operation must have been of the most languid and imperfect kind,—a state of things, of course, highly unfavourable to success after tying an arterial trunk."

I venture to remark, as a healthy action had been established in the stump, and no diseased condition of the veins in the immediate neighbourhood attracted observation, I am inclined to attribute the fatal issue of the case to causes which cannot be associated in any way with the operative procedures; for I recognise in the coincidence of dysenteric ulceration of the intestine and hepatic abscess, a chain of events elucidated by the researches of Budd, and supported by the results of considerable personal observation. Moreover, had the pyæmia arisen from unhealthy action in the stump, it is more than probable organs and parts more intimately connected than the liver with the general circulation, such as the joints, kidneys, lungs, &c., would not have been found wholly free from purulent deposits.

Remarks.—The leading features of these two interesting cases are injury to the common femoral artery and vein from the incautious employment of potassa fusa, in their immediate neighbourhood, for the destruction of diseased lymphatic glands; deligation of the external iliac, followed, in one instance, by secondary hæmorrhage from the distal extremity of the vessel; extensive gangrene of the limb, and a fatal issue from exhaustion; in the other by gangrene to a more limited extent, amputation in the middle of the thigh, and death from hepatic abscess. And they elucidate the important facts that when the femoral artery and vein are involved in a common destruction, mortification of the limb would appear to be inevitable, and that deligation of the external iliac artery is not the only primary proceeding which ought to be trusted to. It is seen, from T.'s case, that secondary hæmorrhage from the distal extremity of the injured vessel is a probable and highly important contingency, for its occurrence threatened immediate dissolution from syncope, and, recurring, deprived him, by the effects of terror and exhaustion, of the hope which amputation, but for that circumstance, would have held out.

In P., although the distal end of the superficial femoral was found to be obliterated by a clot, the profunda was not closed, and it may be considered a most fortunate circumstance hæmorrhage did not burst forth from it as the collateral circulation became established, and reduce him, like T., to a condition in which it would have been hazardous to proceed further.

If, therefore, hæmorrhage from this source is rather more than a shadowy probability, and its effects disastrous, if not hopelessly fatal, it would appear to be an imperative duty, after tying the external iliac, to seek at once for the superficial femoral and profunda arteries, and secure them as high up as possible; for, in such distressing cases, it is highly improbable there would be a sufficient length of the common femoral healthy enough for deligation, and, moreover, it would not be advisable to place a ligature there, as the proximity of the division into superficial femoral and profunda would prejudice the formation of a clot. This proceeding would effectually guard against any further loss of blood and exhaustion; and although amputation must be regarded as the final proceeding, the patient would have several days to recover from the shock of the first hæmorrhage. The collateral anastomoses would have time to become developed, and there would be a fair chance that, when it might be right to amputate, in consequence of gangrene, the circulation in the flaps would be sufficiently active to prevent extensive sloughing, and the powers of life sufficiently vigorous to complete the cure.

If, on the other hand, the cavity in the groin should be found sloughy, the parts altered by disintegration, and their appearance and relative positions changed and perhaps unrecognisable, the coats of the vessels would doubtless be diseased, and instead of placing a ligature on them lower down, as I did in T.'s case, I lean to the opinion it would be better practice to amputate at once as high up as possible, and accept the chances of a little sloughing of the flaps rather than run the risk of hæmorrhage, which, by its moral and physical effects, destroys all hope of recovery; and I now exceedingly regret I halted between two opinions, and did not adopt this mode of procedure on the 21st of January, when there was no great depression of the vital powers, as I was in attendance and staunched the hæmorrhage at once.

It is a circumstance of considerable interest and practical importance, that in both cases there was no subsequent bleeding from the proximal extremity of the external iliac artery under Poupart's ligament, and that this did not depend upon chance or accident, for, in both instances, from the point of ligature to that of ulceration, clots had formed, completely blocking up the vessel and presenting a firm barrier against a current of blood setting in through the anastomoses of the circumflex ilii and epigastric with the ileo-lumbar, and internal mammary and lower intercostal arteries.

7. *The External Iliac Artery*, for a large False Aneurism of the Left Femoral.

(Reported by G. K. HARDIE, M.D., Surgeon, 73rd Regiment.)

Private W. M., 2nd Dragoon Guards, 21 years of age, and of five years' service, was admitted into the Lower Orphan School Hospital, Calcutta, on disembarkation, on the 6th March, 1858, suffering from a very large false aneurism of the left femoral artery, extending from half an inch below Poupart's ligament to below the middle of the thigh. Its greatest transverse diameter was at about two and a-half inches below Poupart's ligament.

A number of veinsran over the tumour, suggesting, at first sight, a fungus hæmatodes. The leg and foot were œdematous. The pulsation in the tumour was most marked at its outer side.

He was much emaciated and in great agony from pain in the tumour and limb. He had a bad sore over the left trochanter. His pulse was 111, full, jerking, and with a strong thrill. There was general hypertrophy of the heart, and loud diastolic murmur, revealing incompetency of the aortic valves.

On his passage out to India (21st December, 1857), the left brachial artery had been tied for aneurism at the bend of the elbow. After this, in the middle of January, he complained of pain in the left thigh, when a smaller tumour was perceived. It rapidly increased as a round swelling on the inside of the femoral, until it obtained a transverse diameter of seven and a longitudinal of six inches. The pain was at all times great, lancinating in character, and worse by night.

On the 21st February, while at stool, the thigh below the tumour was reported to have suddenly swollen very greatly. The next day the leg and foot participated in the swelling, which was elastic, pitting with difficulty. This state continued for a few days, and then gradually subsided, leaving the tumour as before described in size, but having lost its circumscribed form.

Such were the state and history of the patient on his arrival in India.

A consultation took place on the 11th March, when it was decided to tie the external iliac, which was accordingly performed by me next morning.

An incision, about three inches long, was made nearly parallel to Poupart's ligament, terminating over the internal inguinal ring; the tendon of the external oblique muscle being divided in the whole length of incision, and the internal oblique and transverse muscles carefully divided at the lower end of the wound sufficiently to admit a finger to separate them from the transversalis fascia below, when they were also divided to the full extent of the wound. The peritoneum was detached from the fascia, and with the neighbouring intestines drawn by a broad copper tractor to the upper and inner side of the incision. The sheath of the artery was then opened at its inner and outer edge, the needle passed through these openings from within outwards, and the ligature firmly tied. The pulsation of the tumour at once ceased. The wound was brought together by three sutures, and covered by a wet compress. The limb from the toes upwards was swathed in carded cotton, secured by flannel bandages.

The pulse, which before the operation was 102, fell at once to 94, and half an hour later to 87.

The pain in the tumour, which had been agonizing for some weeks, ceased from the time of the operation (which was done while the patient was under the influence of chloroform). The night but one afterwards he slept half the night, and was easy the rest of it. During this day, while lighting his pipe, he had set his mosquito curtains on fire, and though they were blazing he exhibited hardly any excitement or alarm. They were quickly torn away from the bed.

On the 16th he was noted as "very hungry," and on the 18th there was free discharge from the track of the ligature. On the 20th, pulsation was distinctly felt in the dorsal artery of the foot. On the 26th pain had ceased, and the circumference of the thigh at the most prominent part of the tumour had diminished half an inch. Pulsation was not felt in the posterior tibial, but was very distinct in the dorsal artery of the foot.

On the 28th, at 10 a.m., the ligature came away. This was sixteen days and three hours from the time of deligation. He was now greatly improved in health, as shown in his countenance. The tumour was felt to be much softer, almost with a sense of fluctuation at its lower and inner part, where previously the tumour had felt most dense.

On the 17th of April the tumour was being slowly absorbed under the application of the iodine liniment; and he was walking about at first with the help of crutches, and afterwards with a stick.

On the 11th of May he had a slight febrile paroxysm, which ended in sweating.

On the 27th, cough, hæmoptysis, and several attacks of epistaxis came on, and on the 30th spots of purpura appeared.

On the 6th of June, the circumference of the thigh, at its most tumid part, was still three inches greater than that of the unaffected thigh.

On the 10th, enlargement of the liver and spleen was noticed for the first time, the result of malaria.

On the 16th, the epistaxis returned, and continued for some days. The hæmorrhagic symptoms, including the purpura and bleeding from the gums, ceased after some days' administration of sulphate of soda.

On the 24th, he was walking about like a gravid woman from abdominal tumidity, caused by enlarged liver and spleen.

On the 30th he re-embarked for England. He had been perfectly relieved from all pain from the date of the operation. There was still some unabsorbed fibrine at the seat of aneurism. The operation was thus perfectly successful, though performed under most adverse circumstances of organic disease.

The rapidity with which malarial influences affected him show what feeble powers of resistance he possessed.

I heard indirectly that he died on the voyage home, but could get no details of time or circumstance.

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8. *The Axillary Artery*, for Traumatic Aneurism. (Reported by Staff Assistant-Surgeon J. M. Taylor, F.R.C.S., Royal Artillery.)

Corporal W., Royal Engineers, a strong, healthy man, aged 30, was wounded, on the 21st of August, 1860, during the assault of the Taku Forts, by a small spherical bullet which entered the right arm, about two inches above and behind the insertion of the deltoid muscle, and passing forwards, inwards, and a little downwards, close behind the bone, pierced the arm and wounded, but did not penetrate, the chest. The wounds healed perfectly and quickly under general antiphlogistic treatment and water-dressing; but there remained almost total loss of power of the arm and hand, and the man continued in the hospital ships up to December 3, 1860, when he was transferred to the General Hospital, Hong Kong, and came under my care. He was then suffering from aneurism of the right brachial artery, which, he said, came on gradually as a small tumour.

About six weeks before his admission, the tumour first made its appearance. It appeared first close to the inner and anterior cicatrix, but a little above it. It continued to increase slowly but steadily, causing acute pain, especially in the hand and wrist.

The appearances were, on coming under my observation December 3, 1860, a pulsating tumour, about the size of a large orange, on the inner and anterior aspect of the arm, at the insertion of the great pectoral muscle. It extended about half its size into the axilla. A distinct bruit was heard with the stethoscope, and even felt by the finger. The pulsation could be felt when grasping the tumour laterally. There was great pain in the hand and wrist, which parts were also much swollen. The pulse at the wrist was not much interfered with. The arm was considerably wasted, and he had never recovered the use of it since the wound.

There appeared no doubt that the disease was "traumatic aneurism" of the brachial artery, just at its commencement. Compression could not be employed owing to the seat of the aneurism, and cold, &c., had no effect. The tumour still increasing, it was decided, after consultation, to operate on December 6, 1860.

I elected to ligature the axillary artery in its first stage.

The patient, being placed on a conveniently high table, with the shoulders somewhat elevated, chloroform was administered, the arm was abducted, the elbow being about six inches from the body. An incision about four inches in extent was made parallel to the clavicle, its external extremity commencing at the inner edge of the deltoid muscle; the skin and platysma myoides muscle were carefully divided; the cephalic vein was laid bare, and held aside by an assistant; some of the clavicular fibres of the pectoralis major muscle were divided, and a small muscular branch of the acromial artery being cut, was ligatured to prevent its bleeding, embarrassing the operation; the areolar membrane was *scraped* aside, and the "ligamentum bicorne" come down upon; this fascia was pinched up by a forceps, and horizontally divided; it was further divided on a director; and finally, with the finger for a guide, the ligament was completely divided. The artery was then felt pulsating at the bottom of a deep incision. The vein was with difficulty distinguished to the inner side of the artery, and the brachial plexus were felt close to, above, and to its outside, but apparently on a plane posterior to the artery. Every attempt to clear the vessel for ligature was attended with contraction of the pectoral muscles, causing much delay and embarrassment. The ligature was finally passed from within outwards round the artery, care being required to avoid including the nerves which lay close to its outside. The pulsation of the tumour ceased at once on the tightening of the ligature. The wound was closed by drawing the arm towards the chest as much as possible, the tumour preventing perfect adduction. Three sutures were inserted to keep the edges of the incision in close apposition, and wet lint was applied to the wound.

During the six following days the patient had not a single bad symptom; the tumour diminished rapidly, and the pain in the hand had lessened; the heat of the limb did not sensibly decrease. I then lost sight of the case, being ordered to embark for England on the 12th of December. The man, however, recovered rapidly. Although the arm was considerably weakened he was able to resume his duty; was promoted to serjeant, and finally obtained his discharge about two years afterwards, having completed his term of service.

In October 1864 I saw and carefully examined him, and had him photographed. He had then recovered the use of the arm to a great extent—almost entirely, the hand alone being much affected. He has lost the power of flexing the ungual phalanx of the thumb of right hand. He can write and grasp strongly with the hand. There is some slight flatness of the chest at the seat of the incision, and the arm, forearm, and hand are slightly smaller than the left extremity.

Observations.—The difficulties of this operation are well understood. The greatest in this case were the contraction of the pectoral muscles whenever touched by the hand or instruments, the great depth of the incision, and the difficulty in avoiding the brachial plexus of nerves. The cephalic vein was of great assistance in guiding me to the vessels, in the first instance. The division of the great pectoral muscle does not appear to have been attended by any serious results. I would again operate in a similar way for a similar aneurism, but would be inclined to prolong my incision more towards the sternum, to allow of easier access to the vessel.

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9. *The Common Carotid.* (Report of a Case of Arterial Ulceration from Abscess, occurring in a Soldier who had received a Wound in the Face at the Assault of the Gate Pa, in New Zealand, one of the Consequences of which Wound was Ligation of the Common Carotid Artery for the Control of Hæmorrhage. By Assistant-Surgeon G. N. Manley, V.C., Royal Artillery.)

Private J. L., 43rd Light Infantry, aged twenty-five years, a soldier who had previously enjoyed good health, was struck, during the assault of the Gate Pa on the 28th of April, 1864, by a musket-ball, which passed through the cheek and fractured the right lower maxilla. The bullet caused great comminution of the horizontal ramus, and carried away the canine, bicuspid, and molar teeth, with the alveolar process on the same side. The injury was attended with considerable primary hæmorrhage. The hæmorrhage recurred five days afterwards very profusely, the blood coming from the inferior dental artery. On the man beoming faint the hæmorrhage ceased; but, during the next four days, it broke out again from time to time, and defied all attempts to arrest it. The artery could not be secured, and the man was reduced to a very critical state. On the night of the tenth day from the infliction of the wound, at about 11 o'clock, the hæmorrhage again came on profusely. The common carotid artery was then tied, just below its bifurcation, by Staff Surgeon Home, V.C., and this proceeding proved effectual in permanently arresting the bleeding from the gunshot wound. The ligature came away on the eighth day after the operation.

Subsequently to this the case did well, and the patient so far recovered as to be able to be moved to the General Hospital at Auckland, a distance of twenty hours' passage by sea. He arrived at Auckland on the 8th of June, viz., forty days after the infliction of the original injury, and thirty after the ligature of the carotid artery. The incision made for this operation had then healed, with the exception of a small part near the centre of the cicatrix, where some fungoid granulations formed a prominence of about the size of an almond. His general health was very good.

The absence of complete closure of the wound was found to be connected with the existence of an abscess, having its seat under the right sterno-cleido-mastoid muscle, near its clavicular attachment. On the 11th of July, sixty-three days after the operation, while the man was asleep in bed at night, hæmorrhage occurred from the wound in the neck. About fourteen ounces of blood were lost. It appeared to be venous, and was stopped by light pressure by the finger over the small orifice in the line of incision through which it was escaping. On the 17th of July, six days afterwards, the bleeding returned to the extent of four ounces; and during the same day it recurred at frequent intervals, great doubt existing as to its exact source. Severe throbbing pain always preceded each fresh outburst, and the sub-clavian artery pulsated very violently. Occasional rigors also occurred.

On the morning of the 18th, at three o'clock, just as he woke up, hæmorrhage came on again. A consultation was held, at which it was decided that no surgical interference should be adopted, but that pressure alone should be resorted to. The general opinion was that the bleeding came from some small veins situated under the muscle within the sac of the abscess, and that these were from time to time opened by a process of ulceration. During the three following days there was oozing from the wound, but the discharge was of a serous character mixed with pus. On the 22nd of July the discharge consisted of thick pus without any admixture of blood; and this continued until the morning of the 28th. On that date, at half past 11 o'clock, the bleeding again burst out, and he lost about two ounces of blood before it was again stopped by pressure. At half past 11 P.M., the patient, when seen, appeared to be asleep, but the blood was flowing freely from the wound. It was now seen decidedly to be coming from an artery, believed to be a branch of the superior thyroid, as there was a point from which it could be noticed issuing by jets, although the impulse was not powerful enough to raise it more than one-sixteenth of an inch from the surface of the wound.

On the 1st of August, as the discharge of pus continued from the abscess, which was evidently the primary cause of the bleeding, it was determined, on consultation, that a depending opening should be made, so that the matter might be able to drain away more easily. A director was passed down through the original opening into the pouch of the abscess, and held there, so that the point might act as a guide on which to cut down. An incision was then made at a spot about two inches from the lower margin of the incision in the first operation, and an attempt made to reach the sac of the abscess behind the sterno-mastoid muscle. This was, however, after a most patient dissection, abandoned, chiefly on account of the great hæmorrhage which occurred in consequence of the enlarged collateral circulation. From this time there was no recurrence of the bleeding. The opening in the original wound became soundly healed twenty days after the operation last attempted, and has remained closed.

The interest in this case was due to the uncertainty of treatment best adapted for meeting the exigencies which it presented, for the previous reading of the Medical Officers here did not enable them to recollect one similar. The patient had been reduced to a very low state by the repeated occurrence of hæmorrhage, and none of the remedies which had been devised served to arrest it effectually. It seems likely that the thorough stirring up which the abscess got by the insertion of the director into its track in the last attempted operation, excited inflammation in its lining membrane which led to its closure. If this was not the explanation of the case I do not know what was; and, in the event of a similar case occurring in my own practice, I should endeavour to excite inflammation in the abscess by similar means.

Remarks on the Case above described. By Deputy-Inspector General Thomas Longmore, &c., &c.

The case related by Assistant-Surgeon Manley is of great interest. Those who are familiar with the records of surgical practice in London will remember the much-talked of case which occurred to the celebrated surgeon Mr. Liston, some years ago, in which having punctured what he supposed to be a large abscess in the neck of a boy, a gush of arterial blood followed the insertion of the bistoury, and a loss of several ounces occurred in a few seconds. An account of the occurrence referred to was brought before a meeting of the Royal Medical and Chirurgical Society in March 1842 by Mr. Liston himself. Mr. Liston stated that, from the early history of the case, as well as from an examination of the parts, he had been led to conclude the disease was originally a chronic abscess of a scrofulous character, and that the opening into the artery was consequent upon ulceration from without. He related, in confirmation of his statement, the details of three other cases in which large arteries in the neighbourhood of abscesses had been opened by ulceration extending into them in each instance from the sac of the abscess. In one of these instances the patient was a medical student, and the tumour opened was a genuine abscess, and discharged matter for fourteen days before any blood was observed to come away. Although the occurrence of ulceration of blood-vessels lying within the sphere of influence of purulent collections had been long before noticed,* the report of these cases, and the discussion which followed, attracted more attention than had previously been turned to the subject, and from time to time since other similar cases have been occasionally noticed. They have been exceedingly rare, however; so much so, that in many works on surgery the liability of an abscess leading to an opening of neighbouring vessels by ulcerative action and inducing hæmorrhage is not even noticed.

A very distinct case, in which an attack of scarlatina in a child was followed by suppuration of a cervical gland and spontaneous opening of the abscess, discharge of pus for five days, then hæmorrhage, and finally death in consequence, was communicated by Mr. Lane to the Medico-Chirurgical Society, in February 1843, and will be found published in the Transactions. A post-mortem examination was made of the parts involved in the disease. "The internal jugular vein and carotid artery," Mr. Lane relates, "were transversely divided some distance lower down the neck; and, on passing a probe upwards to the abscess, an ulceration of an oblong shape, of about five lines in its long axis, was observed in the inner side of the internal jugular vein opening immediately into the sac of the abscesses." In June 1846, Mr. Busk gave to the same society an account of a case in which an abscess in the neck communicated by an ulcerated opening with the arch of the aorta, and led to death. Mr. Busk remarked that the chief interest of the case lay in its "affording an unequivocal instance of a communication being formed between the cavity of an abscess and a large arterial trunk, in consequence of an ulcerative process being set up from without, and going on to produce such a thinning of the arterial tunics, that they finally gave way under the impetus of the blood." In the spring of last year (1864) several cases of ulcerative opening of blood-vessels occurring as a consequence of abscesses in the neck, axilla, groin, and femoral region, were referred to at the Surgical Society of Paris, in the course of a discussion provoked by the narration of the case of a lady in whom the external carotid artery had had to be tied for the suppression of hæmorrhage, occurring on the seventeenth day after pus had been discharging from a glandular cervical abscess. Such cases establish the fact that blood vessels, both arteries and veins, may, on certain occasions, ulcerate into the sacs of abscesses, notwithstanding the various and usually effective provisions made by nature for their protection. The existence of arteries within and across gaps resulting from abscesses, even although all the surrounding structures have been softened down and removed, are familiar occurrences in surgical practice; sometimes pulsating with their outer surfaces covered by thick lymph, sometimes with their function destroyed, but, at the same time, with hæmorrhage prevented by means of internal plugging by coagulum. It is important, however, to know that there are conditions under which these means of safety may be absent, so that, in case of hæmorrhage, occurring under such circumstances, it may not be wrongly attributed to surgical neglect, or to accidental injury in the performance of some manual operation. The case related by Assistant-Surgeon Manley is especially interesting in this respect. The abscess which led to the erosion of the bleeding vessel was the result of a wound made in the performance of an important surgical operation, and, in this respect, it differs from all other recorded cases with which I am acquainted. The cases previously recorded have usually happened in strumous subjects, and no surgical interference has been employed until after the formation of the abscesses had fully taken place. Of course no one who carefully perused the case related by Dr. Manley could suppose that there was any direct connection between the operation of ligating the carotid and the secondary hæmorrhage,—the history would sufficiently dispel such a supposition; but had the operation-wound not healed so favourably, and had the hæmorrhage occurred earlier, such a suspicion might have been excited among persons unacquainted with the facts previously related.

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* Mr. John Pearson, in his Principles of Surgery, published in 1788, had remarked on this occurrence. (See Obs. 175): "Although the larger arteries have been known to be surrounded with purulent matter for a considerable length of time, without suffering any injury, yet this is not universally the case; there have occurred many instances where erosion has taken place, and the person has been suddenly destroyed by the hæmorrhage."

It is not quite clear, from the narrative of the case, whether the incision made on the 1st of August ultimately effected its purpose of forming a depending opening for the draining away of the partially locked-up pus in the pouch of the abscess, or not. It is evident from the remarks that a direct communication could not be established at the time of the operation between the end of the director and the point of the knife; but, although the account states that the bleeding stopped, and that the opening of the original wound began to heal, from this date, it makes no mention of what followed in respect to the lower incision. If the discharge from the abscess found an exit, after a time, by the dependent opening, the after progress of the case would be rendered more easy of explanation. Neither is there mention of any styptics having been employed with a view to arrest the oozing or flow of blood. There can be little doubt, however, that some remedies of this class were used, though without success.

Private L., the patient referred to in the foregoing remarks, arrived at the Royal Victoria Hospital, Netley, from New Zealand, on the 31st of January, 1865. All the parts involved in the surgical operation for the suppression of hæmorrhage, as well as the wounds of the face and fractures of the lower jaw originally caused by the projectile, were then soundly healed. The injuries done by the bullet were followed by the disabling consequences which are described in the following notes; they were recorded at the time the patient was at Netley :—" The cicatrix of the wound of entrance of the projectile is well marked. It is irregular in shape, one inch in extent, depressed, and adherent to cicatricial tissue beneath. The cicatrix of the wound of exit is also well marked, is circular in shape, three-quarters of an inch in diameter, slightly depressed, and slightly adherent. The cicatrix of the incision made to ligate the carotid is one inch and three-quarters in length, and extends in a direction downwards and inwards from one inch below the angle of the jaw to a line on a level with the superior border of the thyroid cartilage, and one inch and a-quarter external to it.

"Two distinct lines of fracture through the lower maxilla are visible; one anterior, extending from a point between the canine and next incisor tooth on the *left* side in a vertical direction downwards; the second posterior, passing backwards and downwards in an oblique direction from the site of the canine on the *right* side to a point about a-quarter of an inch in front of the angle of the jaw on the same side.

"Both fractures are now firmly united. The molars, bicuspids, and canine tooth of the right side are lost. The four incisors, together with that part of the lower jaw included between the two lines of fracture before described, have sunk and are so depressed that, when the mouth is closed, the incisors of the lower jaw do not meet the incisors of the upper jaw. He can only partially open his mouth. When he swallows, he complains of pain in the throat. The right side of his face feels cold, and has lost some sensibility. He states that he has a pain in the right side of his head, which is nearly constant, and that he sometimes feels giddy. He has a heavy expression of countenance. He was discharged to his home as a pensioner on the 28th of February, 1865."

TAPPING IN HEPATIC ABSCESS.

By Assistant-Surgeon W. H. Climo, M.D., Rifle Brigade.

1. *Short Abstract of a Case of Acute Hepatitis, followed by Abscess—Abscess Tapped—Recovery.*

Private J. A., Rifle Brigade, aged 34, of six years' service (all in India), was admitted into the hospital at Meerut, on the 28th of November, with continued fever, which was attended with much abdominal pain. When I saw him for the first time the next morning he was in a high state of fever, the pain in the abdomen was most intense, with excessive tenderness, especially a little above the umbilicus; decubitus dorsal, and the lower extremities elevated; the countenance was very anxious, and there was great prostration of strength; the symptoms at this time indicated acute peritonitis; accordingly I ordered a sinapism and turpentine fomentations to the abdomen, and subsequently very light and hot bran poultices to be continuously applied, diaphoretic mixture to be taken every second hour, and twenty grains of quinine during the day. I did not order leeches or local bleeding, as he was in such a very weak and low state. Under this treatment he improved a little—the fever subsided, the pain and tenderness of the abdomen were very sensibly diminished; but the next evening (the 30th) he had a second accession of fever, with an increase of abdominal pain and tenderness, and the following morning the pain and tenderness were persistent in the right side, but he was quite free from fever. Corresponding to the seat of pain and tenderness, I remarked a slight swelling, or rather fulness, in the right hypochondrium, close to the median line. The disease was then diagnosed as acute hepatitis affecting the anterior aspect of the right lobe of the liver, and implicating its peritoneal covering.

The history of the case was as follows:—For some time previous to the attack of fever he had been suffering from dyspepsia and impaired general health, for which he had been under treatment in hospital; these symptoms being relieved, he was discharged on the 7th of November. About two days prior to his present admission he was attacked with fever. He states that prior to enlistment he had lived an irregular life, and drank freely, and since then had usually taken the allowance of liquor permitted at the canteen. On the morning of the 2nd of December he seemed much easier, had no return of fever, and the pain and tenderness of the right side were relieved; but the bulging forward of the right side continued, although it was not so well defined as on the previous day. There was some softening present, but fluctuation could not be detected. He stated that last night he felt something give way a little to the left of the tumour, and immediately after this he vomited something, which he describes as having been peculiarly offensive; from what I could learn of the circumstance, an hepatic abscess seemed to have burst into the stomach. He felt greatly relieved immediately after. From this date up to the evening of the 3rd he continued very easy; his bowels were rather inclined to be confined, but they were kept regular by linseed-oil enemata. The pain in the right side, which was very slight at the evening visit, about 9 p.m. became much more severe, and assumed a darting character; the swelling was more defined, as well as the lower margin of liver; in the median line aortic pulsation was very loud, indeed preternaturally so; the hepatic abscess was evidently making its way forwards. To assist this, I ordered very thin and warm linseed-meal poultices to be applied every half-hour. Next morning the swelling was still more distinct, but still somewhat diffused superiorly and to the left, but inferiorly its circumference could be felt quite hard to the touch. His general health was bad, the debility was increasing, but his tongue was clean, and pulse about 64 in the minute. I then informed him I thought it would be advisable to tap it and draw off the matter, to which he was quite willing. He was seen shortly afterwards by Dr. Beatson, Inspector-General H.M.'s Hospitals, and by Dr. Fraser, Surgeon Rifle Brigade, who were also of opinion that the abscess should be tapped at once, as he was becoming very much exhausted by pain and want of sleep. Dr. Beatson detected fluctuation just above the lower margin of the swelling. Having given the patient a little wine, I introduced the trocar in the situation where Dr. Beatson detected the fluctuation, and gave exit to the pus; the canula was left in about an hour and twenty minutes, when only blood flowed away. About three and a half ounces of pus escaped, the puncture was dressed with lint steeped in warm oil, and as he complained of a good deal of pain in its vicinity, a draught of sulphuric ether and tincture of hyoscyamus was given him; and to support him in his very exhausted state, beef tea, sherry, and brandy, and egg mixture were freely allowed. Next morning he was much better, slept nearly all night, there was no pain in the abdomen, which was soft to the touch, pulse about 60, countenance cheerful, and altogether he was so much improved that the most superficial observer could have recognised the improvement. From this date his recovery was almost uninterrupted; on the 6th the puncture was quite healed, and the abdomen assumed its natural softness. At times he suffered from constipated bowels, with pain and tightness in the right side. especially from atmospheric changes; but these symptoms were very amenable to treatment, and under the use of quinine and the mineral acids he regained strength very rapidly. On January the 27th he was discharged from hospital, for a time to attend, but at present to do light duty. He is now (28th February, 1865) in pretty good health, and has gained flesh since his discharge.

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2. *History of a Case of Hepatic Abscess following an attack of Acute Dysentery, and occuring in a child aged three years and four months. Abscess tapped. Fatal result.*

J. M., a boy aged 3 years and 3 months, born in India, was admitted into hospital at Meerut on the 28th of November, suffering from acute dysentery, brought on by exposure to cold and hardship when travelling up country. The dysenteric symptoms gradually subsided under treatment, and on the 12th of this month he was altogether free, even from looseness of the bowels, but remained in hospital under the head of "asthenia." From this date up to the 24th he presented no symptoms worthy of note, except indeed that, if anything, he seemed to lose ground, and to become more wasted. During all the time of his illness he was so peevish and irritable as to prevent such an examination being made as was desirable. On this date, on examining the abdomen, I detected a well-marked swelling on the right hypochondrium, which was dull on percussion, and extended upwards so as to encroach very considerably on the right lung. Decubitus was on the right side, so as to give greater play to the left lung. There was but little, if any, abdominal motion during respiration. I ordered the swelling to be painted with iodine, and subsequently very warm linseed meal poultices to be applied every half hour.

On visiting him next morning I found the swelling greater, but it was not so prominent as on the previous evening. The inferior margin of the liver was well-marked, and very defined to the touch. Fluctuation was not evident, but the general symptoms, the history of the case, and more especially the appearance and position of the swelling denoted hepatic abscess. The case was shortly afterwards seen by Dr. Fraser, Surgeon, Rifle Brigade, and by Dr. Longhurst (Surgeon to his Excellency Sir Hugh Rose, G.C.B.), who both also considered it one of hepatic abscess. As the little boy seemed to be losing ground, and to be getting very rapidly weaker, I proposed to tap it at once. Accordingly, having previously given him some port wine, I introduced the trocar into the most prominent part of the swelling, and immediately pus flowed through the canula. About eight ounces escaped; the canula was left in for about an hour and three-quarters. During the last quarter of an hour only very thin watery serum escaped. The puncture was now dressed with lint steeped in warm oil, and bran poultices were continuously applied to the abdomen, as his stools showed signs of assuming a dysenteric character, and as he suffered from iritability of the stomach, nausea, and sickness. Stimulants and beef tea were also freely ordered.

Next morning (26th) he was, if anything, a shade better, but seemed weak and exhausted from the great drain on his system. The puncture was healthy and without discharge; respiration much easier; and he seemed more comfortable than before the operation; he slept well during the night. He had chicken broth, and six ounces of port wine during the day. One pound of beef as an extra was also ordered to make some strong beef tea for him.

About half-past eleven A.M. he had a stool, which consisted of blood—a large clot, and some slime—and was consequently ordered an enema of acetate of lead and audanum in an astringent decoction, but this was only retained for a few minutes, when it came away, bringing with it another large clot of blood. Ordered five drops of tincture of catechu, with eight drops of decoction of logwood, to be taken in a little port wine, and an enema of four drops of wine of ipecacuanha, one of laudanum, and half an ounce of logwood decoction, in half an hour afterwards. After that, and until evening, he had no motion. Ordered the draught to be repeated at 5 P.M., and the ipecacuanha wine enema at bed time. About 9 P.M. he had another dysenteric stool, when he was given the enema, and at my visit the next morning (the 27th) he had not had any motion. He spent, however, a very restless night, and on examining the right hypochondrium I found the abscess had filled again. I thought it better, owing to the urgency of the symptoms, the acute pain in right side, and the difficult respiration, to re-tap it, and about 5½ ozs. of very offensive pus, mixed with serum, flowed away, and the canula was left in for a quarter of an hour. The puncture was made about the third of an inch below, and a little to the right of the first one, in consequence of the greater prominence in this situation. Ordered the astringent draught of yesterday to be given every four hours, and the ipecacuanha enema to be given an hour after the first draught, and to have two and a-half grains of quinine three times during the day. Notwithstanding, he became much weaker, and at evening visit he was in a state of deep collapse. Stimulants were continued, but without any benefit, and he died from exhaustion about half-past four A.M. on the morning of the 28th.

This case I think worthy of record, as being most decidedly a case of hepatic abscess, following and consequent upon acute dysentery; but what makes it peculiarly interesting is the very early age of the child. Immediately after the operation the very distressing symptoms, impeded respiration, &c., were relieved, and had it not been for the complete exhaustion which preceded it, I have not a doubt but recovery would have been the result. Unfortunately, the parents were adverse to a *post-mortem* examination, otherwise I feel certain the connexion between the attack of acute dysentery and the formation of the abscess would have been traced as between cause and effect.

CASE OF LITHOTOMY.

Abridged from a Report by W. H. Corbett, Esq., M.D., Staff Assistant-Surgeon.

Private E. A., of the 2nd Battalion 9th Regiment, aged 28, of five years service, a stout, healthy, plethoric subject, was admitted into hospital on the 16th October, 1863, complaining of severe pain over the region of the bladder, difficulty in passing his water—at times amounting to complete stoppage—and uneasiness in the perineum.

He states that he has so suffered for the last four years, and that a stone was discovered in his bladder in 1860. I find, on reference to the Case Book, that Staff-Surgeon Dr. Brush, diagnosing a small calculus in 1860, on several occasions, but unsuccessfully, attempted the crushing operation.

On admission, a few ounces of dark heavy-looking urine were drawn off by catheter, and in two hours became offensive, depositing a sediment of lithic acid.

Soothing measures, comprising the warm bath, diuretic drinks of nitre and barley-water, and infusion of buchu, were adopted for three days, after which the stone was distinctly recognised by sounding. On the 20th, permission was applied for to remove the stone by lithotomy. In reply, the crushing operation was suggested. On the 23rd, under the influence of chloroform, the patient was subjected to a search with the lithotrite, but the stone could not be grasped.

On the 28th, having obtained permission, and secured the assistance of several military and civil surgeons, I proceeded to operate. The stone, on this occasion, was recognised with some difficulty, but by manipulation through the rectum its existence was at last ascertained to the satisfaction of all present.

An incision, five inches long and one inch deep, was first made on the left side of the raphe of the perineum, about an inch in front of the anus, and the dissection continued in the usual manner, until the bladder was reached. There was considerable bleeding from an artery at this stage, which was checked by the introduction of a sponge. The stone was grasped and extracted with some difficulty, in consequence of a fold of mucous membrane overlapping its fundus.

The bladder was then washed out and ascertained to be empty, and a gum elastic tube introduced. The usual water-dressing was applied, the ancles tied together, and he was placed in bed.

The calculus was of a brownish colour and hard consistence, was composed of lithate of ammonia, weighed 100 grains, and had its smaller extremity truncated and scooped out, and marked as if by an instrument. Its irregular shape, and the small end—somewhat projected into the prostatic urethra—account for the irritation and desire to micturate which characterised the case previous to the operation.

The convalescence was irregular, and he required much watching and careful treatment. The urine ceased to flow through the wound on the sixteenth day after the operation.

On the 22nd of November, or twenty-six days after the operation, he was considered quite well, and recommended for furlough for change of air.

HISTORIES OF TEN CASES OF STRICTURE OF THE URETHRA (CURED IN THE SURGICAL DIVISION, ROYAL VICTORIA HOSPITAL, NETLEY, DURING THE YEAR 1864. (BY MR. HOLT'S METHOD OF TREATMENT.)

By Staff-Surgeon T. MOORHEAD, M.D.

Case No. 1.—Private W. S., 7th Dragoon Guards, age 25, service eight years, was invalided from Umballa, East Indies, in October, 1863. The stricture was first noticed eighteen months previously, after an attack of gonorrhœa. The affection was thus described in his invaliding document:—"Since then (attack of gonorrhœa) he has been frequently under treatment for stricture of the urethra, and latterly it has become so bad that occasionally the water is obliged to be removed by catheter, and that with the greatest difficulty, and using a small-sized catheter. There is a series of strictures, commencing about an inch from the extremity of the penis, and extending to the neck of the bladder. The urethra, to the touch, seems almost cartilaginous. He has done no duty since May 1863, being either in hospital or convalescent." He had undergone a great variety of treatment before being invalided from India. He was admitted into hospital, at Netley, on 20th June, 1864. After several trials and much difficulty, No. 1 bougie was passed into the bladder on the 28th of June. The patient was very nervous, and the urethra extremely irritable. The first stricture was situated about an inch from the meatus; but there was general contraction of the urethra as far back as the neck of the bladder. After much perseverance, No. 2 catheter was passed on the 5th of July, and No. 3 on the 10th of July. No improvement in voiding urine followed these operations, and several attempts to pass similarly-sized instruments having afterwards failed, the patient was put under the influence of chloroform on the 27th of August, and a No. 2 catheter passed into the bladder with much difficulty, the operation being attended with great spasms. On withdrawal, Holt's dilator was introduced; the stricture split up, a No. 9 gum elastic catheter passed, and the urine drawn off. After this the catheter was passed at first every second day, and afterwards at longer intervals. No bad results followed, except a little spasm and slight discharge resembling that of gonorrhœa. The patient was discharged to duty on the 13th October. He was taught to pass No. 8 catheter into his bladder before leaving hospital.

Case No. 2.—Private D. F., 57th Regiment, age 28, service eight years, was admitted on the 21st of July, and discharged to duty on the 6th of November. History:—Was invalided from New Zealand in February 1864. The stricture was stated to have originated in October 1857, after an attack of gonorrhœa, when stationed at Aden. In New Zealand he suffered from frequent attacks of retention of urine, on being subjected to cold, or after any excess in drinking. In 1863, he was 176 days in hospital with stricture. The following paragraph is copied from his detailed medical history:—"He has an extremely hard and very close stricture. The smallest-sized instruments have been used with the aid of chloroform and the warm bath at different times, by the surgeon of his regiment (who has proposed him for invaliding), as well as by several other military medical officers, but without any success. In his present condition, therefore, he is unfit for the duties of a soldier." Several Medical Officers at Netley tried to pass instruments, but without success. The first stricture was situated about two inches behind the meatus, the second about 3½ inches, and a third behind the bulb. On September 3rd, I succeeded in passing a No. 3 catheter into the bladder. Several attempts to pass the smallest size catheter were afterwards made; but generally without success. On the 5th of October, however, after the administration of an opiate draught and a warm bath, I succeeded in passing No. 2 catheter; and on its withdrawal, Holt's dilator was introduced; the largest-sized tube was then used, considerable force being required to dilate the stricture. After the withdrawal of the instrument No. 11 gum elastic catheter was easily passed, and the urine drawn off. He was ordered a draught, containing sulphate of quinine grs. iij, sol. mur. morphia m. xx. During the day he voided some urine containing clots of blood. On the following day there were pain and tenderness in the perineum, slight rigors, and inclination to void urine frequently. The rigors speedily subsided; but tenderness in the perineum continued for some days, as also the desire to void urine at short intervals. A No. 11 gum elastic catheter was passed into the bladder at first every second day; afterwards, at longer intervals. All symptoms of irritation subsided under mild measures, and the man, who had been previously considered incurable, returned to his duty on the 6th November.

Case No. 3.—Private W. M., 4th Battalion 60th Rifles, age 26, service six years, was invalided from Montreal, in May 1864, for phthisis pulmonalis. He had previously suffered from repeated attacks of syphilis, gonorrhœa, enuresis, and stricture. The stricture became first apparent in December 1862, in the membranous portion of the urethra. The patient was admitted into the Surgical Division, Royal Victoria Hospital, Netley, on the 6th August, 1864. No. 2 catheter was then passed with difficulty after repeated trials. October 10th, after a warm bath an opiate draught was given, and these were followed by the use of Holt's dilator, and the passage of a No. 7 gum elastic catheter. A draught, containing sulph. quinæ and sol. mur. morphiæ, was ordered to be taken after the operation. October 11th, he slept well; pulse 68, and no constitutional disturbance. The urine passed in a full stream and with facility, although attended with slight scalding. 12th, he stated that he felt quite well; had no pain, and very slight scalding. No. 11 elastic catheter was passed without difficulty. 14th, doing well, although there is a slight discharge from the urethra. He is up all day. The discharge continued up to the 24th, when it entirely ceased. October 26th, the stricture is cured, but he is discharged from the service on account of phthisis.

; *Case No.* 4.—Gunner J. G., Royal Artillery, age 33, service six years, was invalided from Rawul Pindee, Bengal, on the 30th October, 1863, on account of "impermeable stricture." The following history of the case has been received:—"Origin uncertain. The affection was under treatment a short time after his joining the late 1st Troop, 2nd Brigade Royal Artillery, in August 1860. It has got gradually worse since then, and at present he passes urine *guttatim*. The extent of the stricture cannot be stated, as no instrument has ever been passed through it. The affection does not appear to have resulted from climate or military service, nor from accident. He states that he has never had gonorrhœa, and has not been treated since joining for this affection." He was admitted into hospital at Netley on the 1st of September, 1864, and attempts were made to pass catheters on the 8th and 10th of September, but unsuccessfully. On the 14th of September, however, after a warm-bath and a dose of opium, No. 1 catheter was passed through two strictures (one four inches from the meatus, the other in the posterior part of the membranous portion) into the bladder. Repeated attempts were made to pass instruments into the bladder between the 14th of September and 13th of October, but unsuccessfully. On the latter date, and again on the 18th, small silver catheters were introduced; but the dilator could not be got into the bladder. On the 24th of October, however, the dilator was passed, and the stricture dilated; the operation causing little pain and no hæmorrhage at the time. This man experienced considerable pain along the perineum, and scalding on micturition for some days afterwards, and he also voided small clots of blood in the urine at the same time. These symptoms then disappeared. The pain along the perineum was not altogether occasioned by the operation, as he had suffered from it for nearly two years previously. While in hospital, he got into the way of passing a large-sized catheter himself, and was discharged well to duty on the 5th December.

Case No. 5.—Driver J. P., 19th Brigade Royal Artillery, age 27, service four years, was invalided from Rawul Pindee, Bengal, on the 10th of August, 1863. The following is the history of his disease, as copied from the detailed case sent home with him.

"*Strictura Urethræ.*—The result of gonorrhœa contracted in England in 1860. He suffered from stricture previous to coming to this country, and arrived in India in November 1861, and has constantly been in hospital with it ever since. There were several hard cartilaginous strictures along the urethra; two of these have been dilated; but a third, near the membranous portion, is impermeable, and no instrument can be passed through it. He has had threatened abscess of the perineum, and once inflammation of the kidneys." It is further stated that his urethra had at all times been in an irritable state, and that no attempts were made at first towards dilatation by catheters, &c., until by local bleeding and warm-baths the irritability was reduced. The first stricture was described to be one and a-half inches from the meatus; the second, a little farther back; and the third, close to the membranous portion. He was admitted into hospital at Netley on the 1st of September, 1864. The patient was kept quiet, attention paid to the state of the bowels, and an occasional opiate ordered. There was great irritability of the bladder and urethra, and calls to void urine at short intervals. The urine escaped *guttatim*. All attempts to pass even the smallest sized instruments were unavailing. On the 8th of October, I made a fresh attempt to pass an instrument, but failed. After a long and patient trial, on the 28th of October, I passed No. 3 silver catheter into the bladder, and allowed it to remain in for an hour; on its withdrawal, Holt's dilator was passed, and the strictures split with the largest-sized tube. On removal of the instrument, No. 11 gum elastic catheter was introduced, and the urine drawn off. No urgent symptoms followed, and from this date there was no difficulty in voiding urine in a full stream. A full-sized catheter was occasionally introduced to prevent tendency to contraction. From the inveteracy of this case, and its long standing, together with the chronic affection of the bladder and kidneys, under which he had previously laboured, he was kept in hospital for the improvement of his general health up to the 5th December, when he was discharged to duty."

Case No. 6.—Private J. R., 20th Hussars, age 24, service six years, was invalided from Peshawur, Bengal, in November 1863, for general physical debility. On his passage down the Indus, in February 1864, he fell down a hatchway, by which the urethra was ruptured, and urine afterwards extravasated into the scrotum, followed by sloughing and fistulous openings immediately behind the scrotum. Two bad strictures followed, one about four inches from the meatus, and the other near the triangular ligament. On his admission at Netley, nearly the whole of the urine escaped through the fistulous openings, and he stated that no instrument had been able to be passed for the previous four months. A small-sized instrument was tried, but it could not be introduced. He improved under the use of warm-baths; but all attempts to pass catheters proved abortive. On the 16th of September, he had retention of urine, which continued up to the morning of the 17th, but was relieved by warm-baths and anodyne draughts. On the 16th of October a No. 2 silver catheter was introduced through the strictures into the bladder with considerable difficulty, and kept in for half an hour, and this was followed by rigors and fever. On October 27th the stricture was dilated by Holt's method, and No. 9 elastic gum catheter afterwards introduced, and the urine drawn off. The following is the report from the Medical Case Book on the day after the operation:—"October 28th, although this patient has been in so weak a state of health, and is still very delicate, yet the operation of yesterday has not caused the slightest constitutional disturbance; he slept well last night, and says he feels quite well this morning, only complaining of slight pain during micturition." The fistulous openings gradually closed, and he was taught to pass a large-sized catheter himself. This man was discharged from the service on the 26th of December owing to his general physical debility. His stricture was completely cured.

Case No. 7.—Private J. P., 30th Foot, age 28, service between eight and nine years, was invalided from Montreal for strictura urethræ. The following remarks are copied from the detailed case sent home with him:—"His disease originated in October 1862, and is attributable possibly to gonorrhœa. He has been five times treated with benefit during the interval; but the stricture is now so hard and unyielding that the smallest instrument cannot be passed." He was admitted into Netley Hospital on the 31st of October. In this case there were two strictures, one immediately anterior to the scrotum, the other in the membranous portion of the urethra. The anterior one could be distinctly felt with the fingers, being excessively hard and cartilaginous. After several attempts, the dilator was passed through the anterior stricture on the 9th of November; but being grasped so firmly, no beneficial effect could be exerted on the posterior one. The anterior stricture was now dilated with the smaller of the tubes; this step enabled me to pass the dilator along the urethra into the bladder, and the same sized tube was again used. On withdrawing the instrument, a No. 7 silver catheter was introduced into the bladder, and the urine drawn off. No larger sized instrument could be passed, and after some days there appeared to be great disposition to return of the stricture. On the 27th of November, I dilated the stricture with the largest tube, and at once introduced No. 10 gum elastic catheter, with which the urine was drawn off. In this case, as there had been frequently very considerable spasm, I allowed the catheter to remain in for some hours, and on its removal, introduced one of larger size. When discharged to duty, on the 22nd of December, he could pass a large-sized catheter himself, and make water in a full stream.

Case No. 8.—Gunner F. A., Royal Artillery, age 23, service nearly ten years, was invalided from Montreal, for strictura urethræ. The stricture was of more than two years' standing, and was stated to have been aggravated by riding, fatigue, and exposure to cold. He was admitted into hospital at Netley on the 31st of October, 1864.

In this case the stricture was situated immediately posterior to the bulb; the urethra was irritable, and at first there was more or less hæmorrhage, on attempts being made to pass an instrument, and, in addition to these difficulties, there were several false passages.

I succeeded in passing No. 2 catheter on the 5th of November, and in drawing off the urine. On the 9th of November, the same sized catheter was passed, and kept in the bladder for a short time. On its removal, the dilator was introduced, and the stricture split with the largest tube.

A similar method of treatment was pursued as described in previous cases, and with satisfactory results. He was taught to pass a large-sized catheter himself, and was transferred to the Medical Division on the 22nd of December for treatment for a different disease.

Case No. 9.—Driver J. H., 9th Brigade Royal Artillery, age 24, with nearly six years' service, was sent from Shorncliffe Camp for treatment for stricture of urethra. The disease was stated to have become first apparent in 1860, after frequent attacks of gonorrhœa. The following remarks are copied from his detailed case, sent with him to Netley, and dated 31st October, 1864:—"On the 1st of August last, he was admitted into hospital suffering from a very severe stricture of the urethra, anterior to the bulb, and he has remained under treatment ever since, while the stricture has increased, not being pervious to No. 1 instrument, and causing the greatest difficulty in passing urine." It was also stated that hot baths, opiates, and chloroform, were had recourse to during the attempts to pass catheters. He was admitted into hospital at Netley on the 14th of November, 1864. The patient was kept quiet, took an occasional aperient, and his general health was attended to up to the 25th of November, on which date the following remarks appear in the Case Book (No. 61):—"Dr. Moorhead succeeded in passing No. 1 silver catheter to-day; the stricture is of four years' duration, and during that time it has been impermeable to all instruments, but permeable to urine in a small twisted stream." On this occasion I allowed the catheter to remain in the bladder for two hours, and on the instrument being removed, I introduced, with some difficulty, Holt's dilator through a very tight stricture at the commencement of the membranous portion. On being satisfied that the dilator had entered the bladder, I passed the larger of the two tubes along the conducting cylinder through the stricture which was thus divided. On the instrument being withdrawn, No. 9 gum elastic catheter was introduced into the bladder, the urine drawn off, and the catheter left in the bladder for two hours. On the following day, there was no constitutional disturbance whatever. He could void urine in a full stream, and with very slight pain. On the 27th of November, or two days after the operation, No. 11 gum elastic catheter was passed into the bladder with facility. The same sized instrument was now introduced, at first, every second day; afterwards, at longer intervals, and the patient was taught to pass the instrument himself. He was discharged to duty on the 21st of December.

In this case, as in several others, there was a considerable discharge from the urethra (resembling that from gonorrhœa) for some days after the operation;

but the discharge suddenly ceased, in all probability, on the mucous membrane becoming healed up.

Case No. 10.—Private B. B., 2nd Battalion 23rd Royal Welsh Fusileers, age 33, service over six years, was invalided from Gibraltar on the 3rd of September, 1864, for stricture of the urethra. The following is copied from the detailed case sent home with him :—" This man was attacked with gonorrhœa in 1860, which was soon followed by stricture of urethra, and it appeared by the Case Book that the Medical Officer then in charge could not succeed in introducing a catheter into his bladder. Since then he has been very frequently in hospital for the affection, and for long periods; but nobody has been able to succeed in getting through the stricture, which is seated far back in the membranous portion of the urethra. There is also a stricture more anteriorly, through which a middle-sized catheter can be passed. He has never suffered from complete retention of urine, but passes it in a small fine stream. The bladder has, however, latterly become affected, and he passes large quantities of ropy viscid mucus, and also complains of lumbar pains. It is thought operative measures may become necessary, &c."

He was admitted into hospital at Netley on the 24th of September, 1864; and several fruitless attempts were made to pass catheters. He was ordered an aperient draught on the night of the 12th of October, and a warm-bath the following morning. On the 13th of October, after much difficulty and perseverance, I got No. 2 silver catheter into the bladder. The urethra behind the bulb seemed to be contracted to the extent of 1½ inches, hard and cartilaginous. On the 14th there were rigors and stricture fever, pain along the perineum, and the urine was voided *guttatim*. He was ordered a mixture containing quinine, tincture of opium, and camphor mixture. No attempts were made to pass instruments again for several days, and, when made, they were unsuccessful up to the 15th of November, when, under the influence of chloroform, a small silver catheter was got into the bladder, but the dilator could not be introduced. I succeeded again on the 24th of November in passing a small catheter through the strictures. On the 29th of November, after the patient had had an opiate, I succeeded in passing the dilator into the bladder, and divided the stricture by the largest-sized tube, after which a No. 10 gum elastic catheter was introduced, and the urine drawn off. This patient had, for a long period prior to the operation, complained of pain along the perineum, aggravated on micturition or pressure on the part.

After the operation there was a copious mucous discharge from the urethra, and this discharge continued for several days, when it suddenly ceased. The pain in the perineum gradually lessened, and was only felt on the introduction of catheters (Nos. 8 and 10 being occasionally passed), and the patient's general health steadily improved. He was kept in hospital for some time, principally on account of chronic conjunctivitis, and partly to enable his constitution to shake off the effects of long-continued suffering. He finally returned to duty, cured.

The foregoing ten cases of stricture were probably as aggravated and of as great variety as will generally be met with in the service, viz.: Organic, spasmodic, irritable, and traumatic, complicated with fistula in perineo, cystitis, hæmorrhage, retention, &c., so that a fair idea can be formed from them of the efficacy of this method of treatment, if attention be duly paid to the instructions laid down in Mr. Holt's work.

The only general after-effects complained of were scalding on micturition, and pain, or sense of soreness, along the perineum, of from two to seven days' duration. In three cases small clots of blood were voided for a few days after the operation; and, as already stated, a discharge from the urethra for some days was an occasional symptom. The men were generally allowed up on the day after the dilatation, and were delighted at being able to void urine in a full stream. I usually gave a dose of opium or morphia about two hours before passing the catheter, and, when passed, left it in the bladder for some hours (when the patient could bear it), and then used the dilator.

How long the good effects of this treatment may last I am unable to say; but the affection being once under the patient's control, it must be owing to inattention should it ever return again in an aggravated form.

CASE OF STRICTURE OF THE URETHRA.

TREATED ACCORDING TO THE PLAN OF MR. HOLT.

Abridged from a Report by Assistant-Surgeon C. S. Wills, 83rd Regiment.

Quartermaster-Serjeant T. B., 83rd Regiment, 37 years of age, and of twenty-one years' service, a stout, active Englishman, had been the subject of stricture of the urethra in India in 1858, for which he seems to have undergone treatment. From that period up to the year 1863, he suffered from difficulty in making water, and for the second time came to hospital. On admission in September of that year, he was found to have a very elastic, cartilaginous stricture, two inches behind the meatus, and about half an inch in length. There was a false passage on the left of the stricture. A No. 1 catheter was with difficulty passed. Eventually, a No. 7 was introduced, and for some months the man was provided with a catheter, which he himself used when necessary.

In May following, he was taken under treatment with a view to splitting up the stricture by Mr. Holt's instrument. From the peculiar elasticity of the constriction, it was necessary to use the very largest dilator, so a No. 14 tube was thrust through the blades of the instrument forcibly, and the man was then put to bed and an anodyne given. At this stage it was found that a No. 12 catheter passed through the stricture with ease.

The operation was followed by slight feverishness, pain, and shivering, but, by the aid of effervescing and anodyne draughts, these effects soon passed away. By the 8th of June following, nearly all the stricture had disappeared, the water flowed in a full stream, and No. 12 catheter could be passed easily, and without giving pain.

The peculiarity of this case consisted in the length, elasticity, and bulk of the cartilaginous hardness, which, despite of metallic dilators, reaching as high as No. 7, even long retained, invariably resumed, after their withdrawal, its undiminished power of constricting pressure, and served to block up effectually the urethra against all egress of urine.

RESECTION OF THE SHOULDER JOINT.

Remarks upon the Cases of Six Invalids, admitted during the year 1864, at the Royal Victoria Hospital, upon whom Resection of the Shoulder-joint had been performed in New Zealand for Gunshot Injuries.

By Deputy Inspector-General T. Longmore, Professor of Military Surgery at the Army Medical School.

On the 21st of July, 1864, ninety-two invalids arrived from New Zealand by the ship "Light Brigade," and among the number were twenty-nine men sent home on account of gun-shot wounds. These men formed the first detachment of wounded invalids who have arrived in this country since the present war in New Zealand commenced*. The "Light Brigade" left Auckland on the 4th of April, 1864; and the time occupied on the voyage was, therefore, 110 days.

The general nature of the wounds of the invalids who arrived by this vessel is shown in the classified return which follows.

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* The commencement of the present war in New Zealand has one feature of melancholy interest to medical officers, inasmuch as one of their number, Staff Assistant-Surgeon William Astle Hope, M.B., of seven years service, lost his life on the occasion of the treacherous attack by a party of Maories on the 4th May, 1863, which formed the first outbreak of hostilities. Assistant-Surgeon Hope was accompanying an escort from an out-post at Taranaki to Auckland, when the whole party were fired upon by natives concealed in the surrounding bush. Dr. Hope was wounded by a musket-ball which penetrated the chest, and, in addition, received fatal injuries inflicted on the head by a tomahawk.

TABLE showing the Number of Invalids admitted under "Vulnus Sclopetarium" from New Zealand, during the Year 1864, together with the Classes and Orders of their Wounds, and the Actions in which they were received.

Classification and Specification of Wounds and Injuries.			Discharged.		Action in which the Wound was received.						
Class.	Order.	Admitted.	Invalided.	Duty.	While on Escort Duty near Drury, February, 1863.	Shepherd's Bush, 17th July, 1863.	While on Escort Duty, 17th July, 1863.	Near Cameron's Town, 1st September, 1863.	Fort Putoko, 2nd October, 1863.	Rangiriri, 20th November, 1863.	Total.
1. Wounds of the Head.	2. With Contusions or Fracture of the Cranium without depression	2	1	1	..	1	..	..	..	1	2
4. Wounds of the Chest	3. With lesion of contents by Contusion, or with non-penetrating Wound ..	1	1	..	..	..	..	..	..	1	1
	5. Penetrating Contents	1	1	..	..	..	..	..	1	..	1
6. Wounds of Back and Spine	3. With lesion of Spinal Cord ..	1	1	..	..	..	..	..	1	..	1
8. Wounds of the Upper Extremities ..	1. Simple Flesh Wounds.. ..	1	1	..	..	..	..	..	..	1	1
	2. With contusion and partial Fracture of long Bones ..	3	3	..	..	1	2	..	..	..	3
	4. With compound Fracture ..	10	10	..	..	..	..	..	..	10	10
	5. Penetrating or perforating the structures of Carpus or Metacarpus	3	2	1	..	..	..	1	..	2	3
9. Wounds of the Lower Extremities ..	1. Simple Flesh Wounds ..	1	1	..	..	..	..	..	..	1	1
	2. With Contusion and partial Fracture of long Bones ..	2	2	..	1	1	..	..	..	..	2
	4. With compound Fracture ..	3	3	..	..	1	..	..	..	2	3
12. Wounds with direct injury of large Nerves	.. ..	1	..	1	..	..	..	..	1	..	1
	Total	29	26	3	1	4	2	1	3	18	29

Some comments will be hereafter made on each class and order of the injuries tabulated in this return; but there is one feature of such peculiar interest among them that it seems to deserve special remark on its own account. This is the large proportion of gun-shot wounds in the region of the shoulder which have led to the operation of excision, or resection, of the head and upper part of the humerus. Out of the twenty-nine invalids no less than six, or nearly one-fifth, have offered examples of this operation, and in every instance the result has been exceedingly favourable. All the wounds for which these operations were performed occurred in one and the same action, viz., the action at Rangiriri on the 20th of November, 1863.* The official army returns of the killed and wounded at Rangiriri shewed that 33 non-commissioned officers and men were killed, and that 69 non-commissioned officers and men were wounded. The proportion of resections of the shoulder-joint to the total number of casualties was, therefore, 1 in 17. Resection was also performed in the instance of an officer wounded in the shoulder in this same engagement. I propose in the following paper to make some general comments on the six cases that have arrived at Netley, and afterwards to give their histories, and the results of the operations performed, in detail.

Although the proportion of the wounds for which resection of the shoulder has been resorted to in respect to the whole number of gun-shot wounds inflicted during the war, or to amputations at the shoulder, cannot be known until the general returns are furnished at the close of the campaign in New Zealand, still the number of cases among these invalids furnishes an indication of their having hitherto occurred in an unprecedented large proportion. It is not easy to account for a preponderance in the number of these injuries from any peculiarity in the action at Rangiriri, or of the warfare generally in New Zealand. The fighting has generally taken place when the opponents were close to each other. The British troops have had in a majority of cases to assault fortified positions defended by the natives, or they have been fired upon by the Maories when they were near at hand, lying in ambush. At Rangiriri the fighting took place in an attack on the natives, who occupied a position consisting of a double ditch and high parapet, with an entrenched row of rifle-pits stretching out behind and at right angles to the front line. There was also a square redoubt of considerable strength in rear of the main line of intrenchment. The nature of the conflict does not give any explanation for the fact of so large a proportion of wounds occurring in the particular region of the shoulder; but the nearness of the opponents sufficiently explains the extent of mischief done to the bones when struck, notwithstanding the small size of the projectile, and the smooth-bore of the fire-arm generally employed by the natives of New Zealand.† The occurrence of injuries favourable to the practice of resection must be considered as probably accidental; but, as regards the operations performed for their relief, these are undoubtedly due to the advanced experience of those medical officers who have had to treat the cases. A few years ago the same injuries would have led to one of two alternatives; either to primary or to secondary amputation of the limb at the shoulder-joint, or to the probable deaths of the patients from the consecutive effects of their wounds without surgical interference.

It is believed that resection operations for gun-shot injuries of joints, which have now been sufficiently demonstrated to be of great practical value, especially when performed in the upper extremity, are not had recourse to so frequently as is desirable in field practice; and, therefore, it may be useful briefly to allude to the experience gained respecting resections of the shoulder in some recent campaigns. The history of the first practice of this operation is fully recounted by Mr. Guthrie in his Treatise on Gunshot Wounds and need not be further alluded to here.‡ During the period of the Peninsular campaigns, as shown by the same distinguished surgeon, excision of the head of the humerus, although it had met with considerable support from Barons Percy and Larrey among the French, was not a recognised operation in the British Army. This arose "not from experience of its failure, but possibly from too great an attachment to the operation of amputation in consequence of its success, and from magnifying the dangers attendant on excision." Even at the date at which this work was written, however, Mr. Guthrie was led to give as his opinion that, wherever the concomitant circumstances were favourable to recovery, excision was a preferable operation to amputation; and he defined the circumstances of each of the classes of cases in which either amputation, excision, or what he speaks of as a different operation "removal of the splintered pieces of bone by incision," was, according to his opinion, the most eligible practice to be adopted. The operation was not regarded with favour, however, by other eminent British surgeons who had witnessed the field surgery of that period. Professor J. Thomson regarded it as unsuited to the circumstances of war surgery.* Hennen, wiht all his wide experience, mentions in his observations that he had never seen the operation performed in the field, speaks of its seriousness, the comparative rarity of the cases requiring it, and its doubtful utility;"† and, from the general tenor of his remarks, shows he did not regard it as one to be recommended in field practice.

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* This would be in New Zealand the end of the spring months or beginning of summer. The season, therefore, would be favourable for the treatment of wounds, admitting of very free circulation of air without personal inconvenience, and lessening the risks of hospital gangrene and other complications.

† The weight of the smooth-bore musket ball ordinarily used by the Maories, judging from the specimens sent home as patterns to England, is 5 drs. 20 grs.

‡ Third edition, London, 1827, p. 470 to p. 506.

Baron Larrey is usually quoted as having performed the operation of resection of the shoulder-joint ten times with recovery in the campaign of Egypt in the early part of the present century. His operation was not, however, strictly speaking, resection of the joint; indeed he says so himself:—"Mais je n'ai point à m'occuper de la résection de la tête de l'humerus que je n'ai pas eu occasion de pratiquer;"‡ but it consisted of the removal by incision of only those portions of the head of the bone which had been fractured by a projectile, or of the whole head when it had happened to be separated by the same means from the shaft. The saw was not employed in the operation, and only those fragments which were absolutely detached were removed. Larrey, however, mentions that this surgical operation had only been adopted in two cases prior to the ten cases here referred to. All cases of similar injury had previously led either to primary amputation of the limb at the shoulder, or to subsequent amputation when the consecutive effects of the wound had become manifest.

The successful results of these cases by Baron Larrey, and of nineteen others of a similar nature mentioned by Baron Percy about the same period, gave great encouragement to the practice of the operation among continental surgeons.

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* Primary amputation, or, otherwise, what has been elsewhere called the "expectant curative" treatment, were the rules of practice for wounds in the shoulder by musket-bullets in which the articulating surface of the humerus was fractured, after the battle of Waterloo. A large proportion of those in whom primary amputation was performed recovered; but of those in whom no operation had been performed, Dr. Thomson writes, "some died during the first attack of inflammation and fever; we saw some sinking more slowly under hectic fever and diarrhœa; and of the remainder, a great proportion had passed, or were passing, into a state in which secondary amputation afforded the only chance of recovery." No instance of excision is alluded to by Professor Thomson, and he himself was led to recommend primary amputation at the shoulder-joint in all such cases. "Whether the necessity for amputation at the shoulder-joint may be superseded by division of the deltoid muscle, and the excision of the head of the humerus in the manner which has been practised by M. Larrey, is a point which must be left to future experience to determine. The number in which this operation would succeed has not been determined; but the length of time and care necessary to complete the cure, and the various accidents to which during the period the injured part must be liable, incline me to doubt whether it will be found of much utility in military practice." Report of Observations in the British Military Hospitals in Belgium after the Battle of Waterloo. By John Thomson, M.D., &c. Edin. 1816, p. 246, &c.

† Observations on some important Points in the Practice of Military Surgery. By John Hennen, Deputy Inspector of Military Hospitals. Edin. 1818, p. 40.

‡ Campagnes d'Egypte, Mémoires, tome ii, p. 172.

Especial attention was paid to resections of joints for gunshot wounds in the Schleswig-Holstein army, of which Dr. Louis Stromeyer was Surgeon-in-chief, in the campaign of 1849 against the Danes; and a monograph treatise, recording very fully the experience resulting from that war on the subject, was published in May, 1851, by Dr. Frederick Esmarch, one of the surgeons engaged in it.[*] Dr. Esmarch shows that of eight cases of injuries to the shoulder-joint, complicated with injury to the bone by gunshot, in which resection was not performed, five proved fatal, and in the three survivors operative interference appeared to be called for after six months treatment; while of nineteen cases of similar injuries in which resection was performed, only seven proved fatal, the cause of death in all being pyœmia, which might have been averted under better nosocomial arrangements. More or less useful arms were saved for the twelve survivors; a certain amount of mobility remained in all, and in many the active mobility returned to so great a degree that the patients could even perform heavy work.

During the Eastern campaign of 1854-55, out of 14,849 wounded officers and men, and out of 998 recorded amputations and resections in the English army, the total number of resections of the head of the humerus was 16. Among these, three deaths took place, or 18·0 per cent.; but, in one of these, in which death took place by gangrene, there was such a complication of other injuries in the neighbourhood of the comminuted humerus that, as stated in the record, it could be scarcely with fairness included in the list of deaths following resections. Ten of the resections above referred to were performed as primary, six as secondary operations.

In the French army the proportion was even less. Professor Legouest has stated that the total number of scapulo-humeral resections in the French army in the Eastern campaign was 38, of which 21, or 55·3 per cent. proved fatal.[†] The total number of wounded officers and men in the French army was 44,044.[‡] The proportionate number of resections, therefore, of the head of the humerus in the French army was 1 in 1,185 wounds of all kinds; in the English army it was 1 in 928 wounds.[§]

In February 1855, the distinguished military surgeon, M. Baudens, recorded, in a memoir upon scapulo-humeral resection, read at the Academy of Sciences in Paris, 14 cases of the operation performed in his Algerian campaigns, out of which number 13 recovered, and only 1 died.[||]

The Sepoy mutiny in India of 1857-58 caused 935 soldiers of Queen's troops to be invalided to England for the effects of gunshot wounds or surgical operations consequent upon them. Among these there was only one case of excision of the shoulder-joint. There were nine instances of complete ablation of the limb at this articulation.

In the Italian campaign of 1859, 26 cases of resection of the shoulder-joint, with 17 recoveries and 9 deaths, have been recorded by Dr. Demme. He also shows that, in 43 cases in which no operative interference was resorted to where the treatment was "curative-expectant," 29 died and only 14 recovered. He records also that, "unfortunately, amputation at the shoulder-joint was practised in very many cases in which resection might have been performed.[¶]

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[*] This Essay was translated by Mr. S. F. Statham, and published by J. W. Tatton, 29, Queen Anne-street, London. 1856.

[†] Traité de chirurgie d'armée. Par L. Legouest, Médecin Principal, Professeur de clinique chirurgicale (Val-de-Grâce), Paris, 1863, page 747.

[‡] Relation Médico-Chirurgicale de la Campagne d'Orient. Par le Dr. G. Scrive, Médecin-Inspecteur, &c., &c., Paris, 1857, p. 349.

[§] Since the above was written, the large work of Dr. Chenu, Médecin Principal, on the medico-chirurgical results of the Crimean campaign has appeared. He states that the total number of resections for fractures of the humerus (query, does this include resections of portions of the shaft?) was 45, and that 25 of those who were subjected to the operation died, while 20 survived to be pensioned. "Rapport au Conseil de Santé des armées sur les résultats du service médico-chirurgical aux ambulances de Crimée, par J. C. Chenu, &c." Paris, 1865, page 504.

[||] Mémoire sur la résection de la tête de l'humérus, lu à l'Académie des Sciences, séance du 26 Février, 1855.

[¶] Militär-Chirurgische Studien in den Italienischen Lazarethen von 1859. Von Dr. Hermann Demme, Würtzburg, 1861, p. 225.

The war in America will doubtless hereafter add greatly to our knowledge of the statistical results of this operation. At present the information published on this head from that country is only very partial.

In a classified tabular return of 20,930 gun-shot wounds treated in the United States Army General Hospitals during the four months ending the 31st December, 1862, and published from the Surgeon-General's Office at Washington in July 1863, it was shown that 269 wounds of the shoulder-joint had occurred. Excision was performed in 51 cases, and the results were shown to be 10 deaths, 15 discharged from hospital, while 26 remained under treatment at the close of the period named. No descriptive remarks accompanied the return.

A consolidated Table of resections, collated from records in the Surgeon-General's Office of the Confederate States, from June 1, 1862, to February 1, 1864, has been published by Dr. Chisholm, Professor of Surgery in the Medical College of South Carolina. This Table shows 68 cases of resection of the shoulder-joint in that period, of which 48 were successful and 20 unsuccessful. Forty-one of these were primary resections with 28 successful results, and 27 secondary with 20 successful results. Professor Chisholm remarks that, in the 48 successful cases, the patients regained very useful arms, the forearm and hand possessing all their former movements. He adds that the "operation was not performed as frequently as necessity required."*

The above statistics tend to show that, while resection of the shoulder-joint has gradually become established as a regular operation in military practice for gunshot wounds involving the articulation, there is still reason to believe from the testimony of competent surgeons, that it has not been hitherto resorted to so frequently as it might have been with advantage. The proportionate number of resections of the shoulder among the invalids who have already arrived from New Zealand leaves no doubt that the value of the operation has been fully acknowledged in practice in the war which is now proceeding in that colony. No case in which amputation at the shoulder has been performed has arrived from it at Netley.

The six resection operations in New Zealand were performed by three Medical Officers, viz., one by Inspector-General Mouat, V.C., C.B.; four by Surgeon W. A. Mackinnon, C.B., 57th Regiment;† and one by Staff-Assistant-Surgeon C. C. Dempster. The portions of bone in the five latter instances have been transmitted to the museum of the Army Medical Department at Netley.

Dr. Mackinnon also practised resection in the case of the officer who, it was before mentioned, received a wound of the shoulder-joint in the same action in which the foregoing six patients received their wounds.

The operation adopted in all the cases has been that by a straight incision on the anterior aspect of the shoulder, in a direction agreeing with the position of the long tendon of the biceps. This is the form of operation which was chiefly adopted by the Prussian surgeons in the Schleswig-Holstein campaign of 1848, where it was known as Langenbeck's method of resection. It is the form of operation generally practised on the dead subject at the Army Medical School, as I believe it to be the simplest, and generally most effective mode, of performing resection of the shoulder in military practice. Least injury is done by it to any of the important structures connected with the articulation. No arterial branches of large size are divided, so that there is no risk of serious bleeding, primary or secondary. It presents no difficulties in its performance that ordinary skill and care will not overcome; and it offers, perhaps, greater facilities for the use of the saw in resecting the upper end of the humerus than any other method. If the long tendon of the biceps has not been destroyed by the action of the projectile, it can readily be preserved. The importance of preserving this tendon for assisting in moulding, and in afterwards acting upon the new articulation, is now generally acknowledged, although its division was formerly directed, as one step in the operation, by Larrey, Guthrie, and many others. The position of the tendon can always be readily determined, even if it be so much covered as to be imperceptible to the touch, by following the outer margin of the muscle to which it belongs, and no difficulty is experienced in setting it free from its sheath up to its origin from the edge of the glenoid fossa. A difficulty in the operation occasionally arises from not carrying the incision far enough upwards, so as to free the tendon from its connections completely up to its origin. If this be not done, an opening is not obtained sufficiently spacious for the easy extraction of the fragments into which the head of the bone may be shattered; and the tendon itself is not so easily turned to either side while the tendinous insertions into the tubercles are being divided. When the tendon is completely loosened, a semi-circular incision, first on one side and then on the other, the arm being rotated by an assistant, if it has not been broken completely across, readily enables the operator to divide the tendinous insertions into the tubercles and the front part of the capsule, and renders easy the division of the posterior part of the capsule, as well as of part of the attachments of the pectoralis major, teres major, and latissimus dorsi muscles, if this be necessary. The head of the humerus, supposing it remains attached, or the upper end of the humerus if the fracture has caused a complete division of the bone, can now be readily brought out of the opening for the application of the saw. If the head of the humerus has been completely separated by the shot, or has been partly split off, these fragments will have to be dissected out; and here "Ferguson's clawed forceps for grasping bone," which forms one of the instruments in the Army Capital case of instruments, renders great assistance to the operator. Without such a firm hold as this instrument affords, the removal of the fragments is difficult.

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* "Manual of Military Surgery, for the use of Surgeons in the Confederate States Army." By J. J. Chisholm, M.D. Third edition, Columbia, 1864, p. 380.

† Another very favourable case of scapulo-humeral resection, performed by Surgeon Mackinnon subsequently to the cases mentioned in this report, arrived at Netley from New Zealand on the 21st of January, 1865.

The chief practical objection to the mode of operation by the single incision over the course of the biceps tendon is that the after-discharges cannot so readily escape in consequence of the opening being in front. Dr. Stromeyer, on this account, introduced another mode of operation by which the joint was opened from above and behind. The incision was commenced at the posterior edge of the acromion and carried semi-circularly backwards and downwards about three inches, and Dr. Stromeyer says, from the facility with which the secretions escaped as the patients were lying in bed, and the consequent prevention of burrowing of pus, the patients operated on in this way overtook in their recovery patients who had been operated upon by the single incision in front months before. The frequency, however, with which an opening occurs behind from the projectile having passed through the shoulder, and the ease with which a counter-opening is made by the surgeon, if the projectile has lodged, or the pus does not readily escape from the front and is inclined to gravitate posteriorly, seem to render this objection of no great weight; while, on the other hand, the ease with which the long tendon of the biceps is preserved, if the projectile has left it intact, and the facility which the whole resection is performed by the single incision, are strong recommendations of the latter method. Moreover, the experience gained by the results of the cases under consideration tend to confirm its advantages.

The various flap operations—horse-shoe shaped flap resections,* as they are sometimes called—formerly recommended, in which the muscles are divided transversely to the line of direction of their fibres, appear to lead to comparatively very unfavourable results, and, though necessary, perhaps, in some diseased conditions of the joints, are no longer justifiable from a musket shot injury of the bone in such young and vigorous subjects as soldiers usually are.

A short time ago there happened to be together in the invalid hospital at Fort Pitt two patients, in each of whom the shoulder-joint had been resected; but in one, by the longitudinal, and in the other, by the flap, operation. The contrast in the results of the two operations was so remarkable, and was calculated to be so instructive, that photographs were taken of the two patients.† The histories of their cases are briefly the following:—

CASE 1. *Operation by Longitudinal Incision.*—Sergeant J. McDonald, 79th

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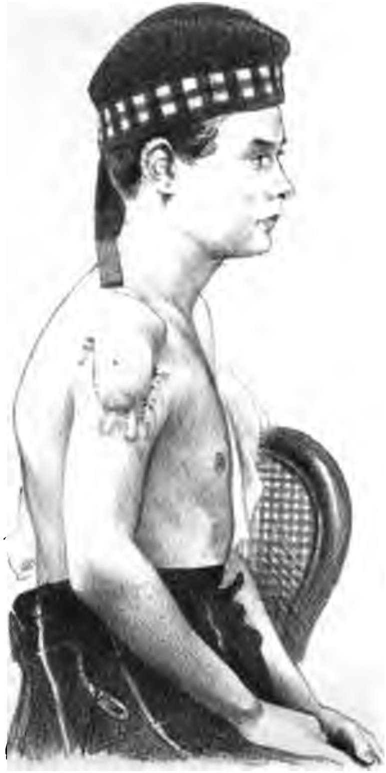
* See case recently reported in the "Lancet" of March 11, 1865.

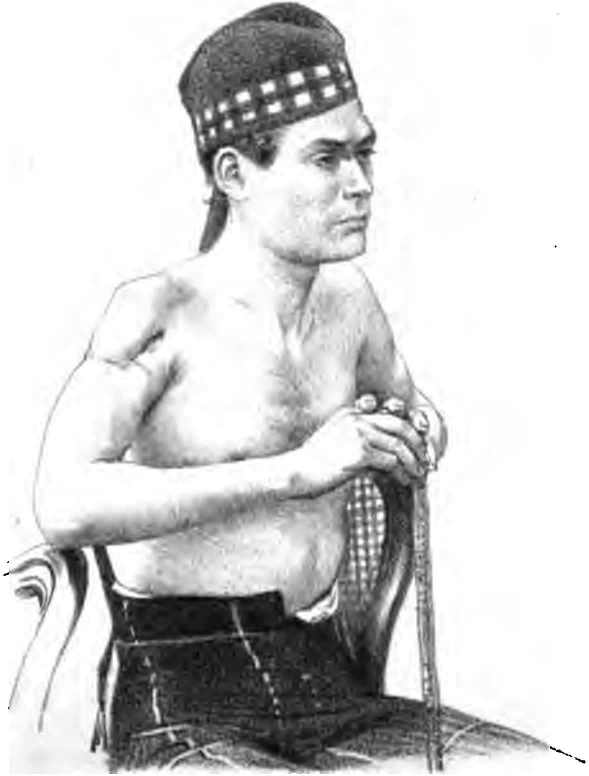
† The lithographic drawings which accompany this paper have been copied from the photographs referred to in the text.

N° 5.



Case of Private Campbell. Drawing to show the course of the incision

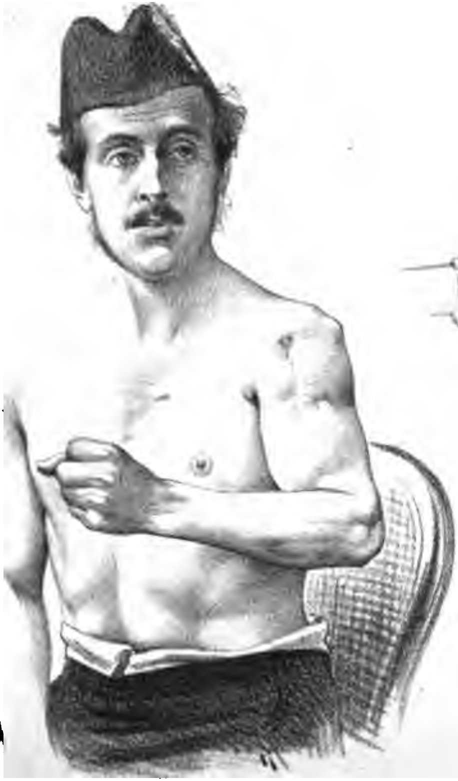
N° 6.



Day & Son, Limited lith

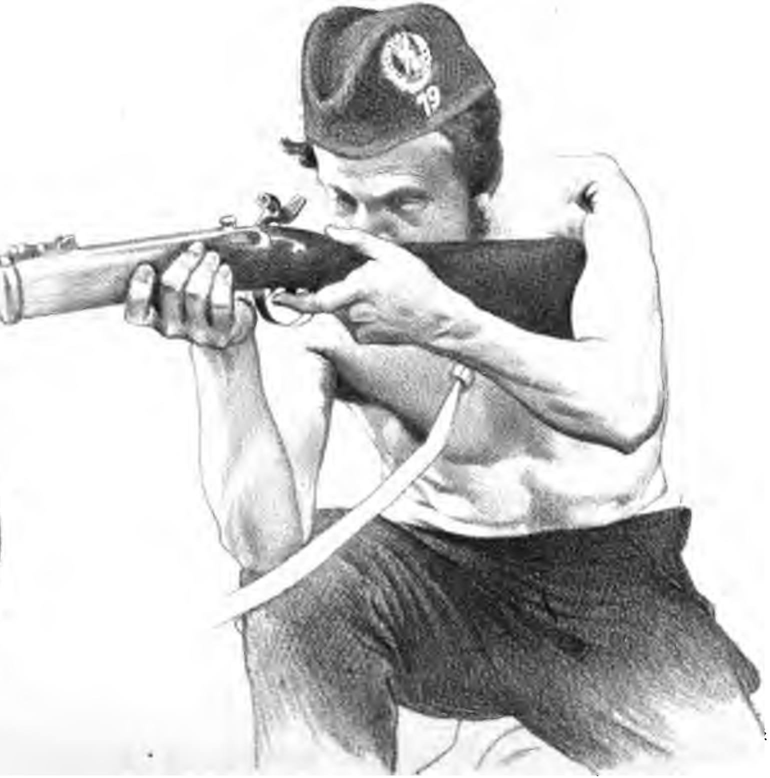
Case of Private Campbell. Drawing to show the extent of abduction admissible when made by an assistant. The hand rests supported by the stick.

N° 3



Case of Serj^t Macdonald. Drawing to show the power of flexing the forearm on the upper arm, & the muscular development

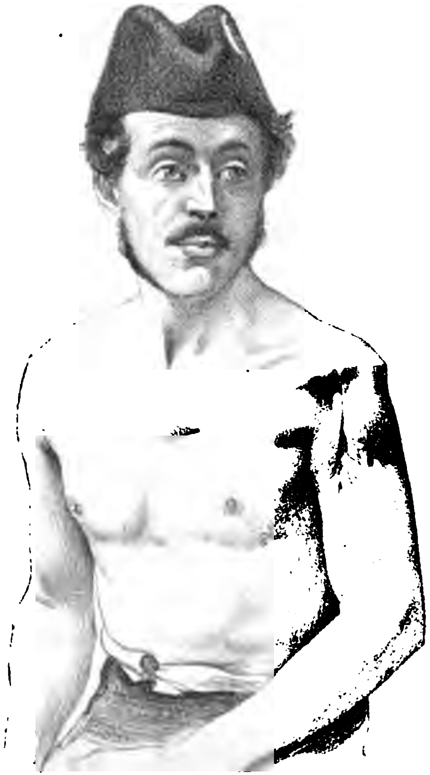
N° 4.



Day & Son, (Limited) lith

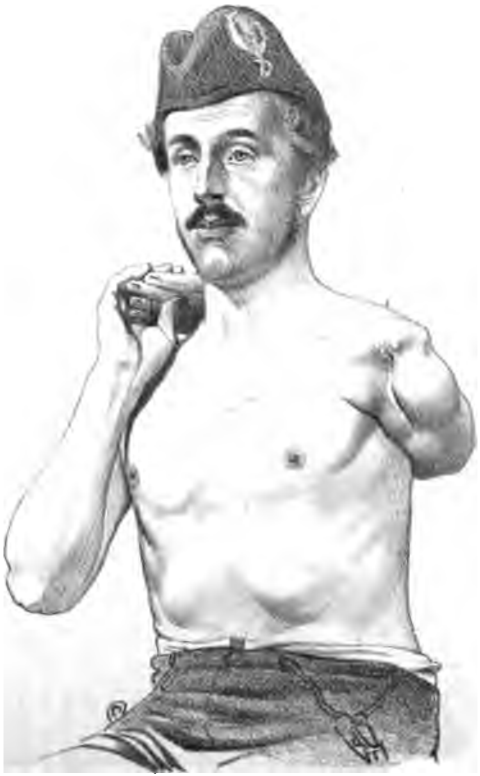
Case of Serj^t Macdonald. Drawing to show the use of the arm in discharging a Firelock.

No 1.



Case of Serj^{t} Macdonald. Drawing to show the line of incision

No 2.



Day & Son (Limited) lith

Case of Serj^{t} Macdonald. Drawing to show the absence of bone between the Acromion & the divided upper end of the humerus. The arm is completely twisted on itself round the Serjeants neck, the back of the hand being shown over the right shoulder.

Regiment, aged 25 years, was wounded at Lucknow, on the 11th of March, 1858, by a musket-ball which struck him in the left shoulder on its anterior aspect.

The projectile penetrated, splintered the head and shaft of the humerus to a considerable extent, passed backwards and downwards, injured the lower angle of the scapula, and lodged between that bone and the chest wall, from which position it was extracted by incision on the day the wound was received.

The same day excision of the head and upper part of the humerus was practised by Surgeon Scot, 79th Regiment, by one long incision, through the anterior aspect of the deltoid muscle. The incision included the opening of entrance of the projectile. The long tendon of the biceps muscle was preserved.

The condition of the left arm of this patient was observed at Fort Pitt in April, 1862, and is well shown in the photographs which were then taken of it in different positions.

The following are copies of notes made at the time named. "The arm is one inch and a half shorter than the sound arm. The union between the upper part of the shaft and glenoid fossa appears to be ligamentous; there is no bone between the projecting point (shown in Lithograph No. 2) and the acromion process, a space of about two inches. The loss of the solid point d'appui deprives him of the fulcrum necessary for the power of raising the arm from the side. He can raise without difficulty three-quarters of a hundredweight with the arm in an extended position by his side, and he can hold 14 lbs. in his hand when the arm is flexed." (As shown in Lithograph No. 3.)

Case 2. *Operation by Flap.*—Private W. C., 78th Regiment, aged 21 years, was shot at Aldershot Camp, on the 23rd of November, 1861, by a comrade in his barrack-room. The bullet passed through the right shoulder, from behind forwards and inwards through the head of the humerus, shattering it and some of the shaft. The openings of entrance and exit were each about an inch below the level of the acromion process.

Excision of the head and of about three inches of the shaft, was performed next day under chloroform. A flap incision was adopted. The two openings made by the musket-ball were connected by a semilunar incision, the convexity descending towards the insertion of the deltoid muscle. The flap was then raised, and the shattered bone removed.

The two photographs were taken at Fort Pitt in April 1862.

The right arm was then two and a-quarter inches shorter than the left arm. All the movements of the joint were very seriously impaired. The man could not in any degree whatever move the arm from his side himself, nor could he flex the forearm upon the upper arm without support from the other hand. The arm could only be abducted as far as is shown in Lithograph No. 6, under passive motion by an assistant. A splinter of bone, partly detached by the projectile in its passage, had become fixed in a direction towards the axillary aspect of the chest, and evidently interfered with the movements in this direction. It fortunately did not press upon the axillary nerves.

The long head of the biceps muscle had been divided, and the transverse division of the fibres of the deltoid muscle had led to almost complete destruction of its power. When the man attempted to move his shoulder in any direction, he only moved the scapula; but when the scapula was fixed, the humerus could be *passively* moved laterally, backwards and forwards, to a considerable extent by the surgeon.

Unfortunately, out of the six cases from New Zealand, the long tendon of the biceps appears to have escaped injury from the shot in only one instance —in that of Private D., of the 20th Regiment. In the histories of the cases sent home with the patients, the tendon is stated to have been destroyed in one instance, to have been divided in another, and to have been lacerated in two others. In the history of Private Hannighan's case, the condition of the tendon when the resection was performed is not mentioned; but, as there was sufficient evidence that the tendon was not in existence at the time the patient reached Netley, it is to be presumed it was either destroyed by the bullet, or that it had sloughed away after removal from its sheath, and had disappeared with the discharges during the granulating process of the resection wound. So also as regards the two instances in which the tendon was not originally completely divided, but was found to have been lacerated, there was reason to believe that these injured tendons, from the well-known inferior capacity for repair inherent in tendinous structures, were entirely lost by subsequent sloughing, for there was the same evidence of their non-existence while the patients were at the Royal Victoria Hospital, as there was in Private H.'s case.

The six cases of resection were all secondary operations. The earliest period of performing the resection after the receipt of the original wound was thirteen days, and the latest was twenty-two days, the average date being nearly eighteen days. This delay does not appear to have been the result altogether of necessity nor of choice, so much as a consequence of the fact of the injury not being at first detected. It is by no means singular that this delay in exact diagnosis should have occurred. Nearly every military surgeon who has studied the subject of gun-shot fractures of the humerus near the shoulder-joint has remarked on the difficulty which exists in many instances of determining, in the early period of the case, whether the joint is implicated in the injury or not. The natural mobility of the shoulder-joint in every direction in a state of health; the absence of any particular amount of pain on motion after the injury beyond what might be expected to be present if the soft parts only had been traversed; the rareness with which any escape of pure synovia can be detected; and the preservation of the roundness and general form of the shoulder, from the manner in which the head of the humerus is held by the capsule and surrounding muscles, will often mislead the surgeon in his examination, although considerable damage may have been done by a musket-bullet to the articulation. This will be especially the case if the capsule has been opened, and the surface of the bone little more than grazed, by a shot traversing across the articulation beneath the deltoid muscle. If, on the other hand, there be much shattering of the head or neighbouring parts of the bone, and the patient place himself in the exact position in which he stood at the time of receiving the injury, the insertion of the little finger of the surgeon at once, before inflammation has arisen, will generally sufficiently indicate the nature of the mischief done.

Baron Larrey has mentioned a way of discovering the injury when there is not much shattering, but the humerus has been simply broken across, just below the head of the bone. Supposing the ball has passed through the shoulder, and the arm is allowed to hang in a dependent position by the side of the chest, on placing the fingers between the two wounds, a deep hollow may be felt; and this sufficiently indicates that a want of continuity exists in the bone, produced by the head being held in the articular cavity, while the body of the bone has sunk down a little from its weight. The immediate digital examination of the wounds does not appear to have been made in the New Zealand cases; and, as the wounded had to be removed from Rangiriri to the general field hospital at the Queen's Redoubt, a distance of twenty-two miles, by ambulance carriage and by water, they could not be examined at this hospital until over two days after the receipt of their wounds. Hence the difficulty of diagnosis after the men reached the hospital.

Staff-Surgeon Dr. Mackinnon, who saw the cases after their arrival at the Queen's Redoubt, and who was kind enough to send me some remarks on them, says,—"You will find it stated in some of the abstract reports of the cases accompanying the invalids, that crepitus was the first indication by which we diagnosed the injured joints. This is a mistake; it was by the use of the probe I made out the true natures of the cases, long after the receipts of the wounds, and when suppuration was fully established. The fact is, the wounded, when first seen on the field, were hastily examined, and the all important examination by the finger was omitted. Consequently, after enormous swelling and effusion had taken place, it was utterly impossible precisely to diagnose the nature and extent of the injuries to the joints. I endeavoured, three days after the men were hit (on which occasion I first saw them) to make out, by digital examination, if the joints were implicated; but so extensive were the infiltration, effusion, and swelling, that no decisive information could be obtained. Indeed, in some of them, I was led to believe that no wound of the joint existed, and only altered my opinion after the inflammatory swelling had subsided and suppuration had become established. Then the injuries were clearly ascertained by the probe, as well as by the drooping appearance of the shoulder, and by the escape of the dirty-reddish oily discharge, consisting of mixed sanious pus and synovia, accompanied with a very offensive odour. The latter sign I consider an unmistakeable sign of a wounded shoulder-joint." There can be no doubt that, in the state the shoulder-joints must have been in, and as they were described by Dr. Mackinnon to have been in, on the third day after the wounds had been received, and after the shaking and movements incidental to the transport from Rangiriri, even if the diagnosis had been at once accurately established, it would have been unwise to have performed resection, and that the probable success of the operation in each case was greatly enhanced by delaying the surgical interference until suppuration had become fully established. The majority of the cases of wounds of the shoulder-joint for which resection has been performed in the various campaigns noticed in the beginning of these remarks have been secondary operations. The reasons for this are obvious; they are the frequent difficulty of diagnosing the cases in the first instance, and, even if the diagnosis be established, the want of means of performing the operation on the field, or even in hospital, before inflammation has arisen. If the diagnosis be established, and circumstances be favourable for performing the resection on the same day that the injury has been received, or before inflammation arises, military experience tends to show that that is the proper time for doing it; but, when inflammation has arisen, then the operation should be delayed until suppuration has been fully established.

There was one noticeable feature in all the cases, viz., the particular wasting of the portion of the deltoid muscle internal to the line of incision, or that portion arising from the outer third of the clavicle, as compared with the portions of the deltoid external and posterior to the line of incision. This wasting was evidently due to the unavoidable division of the terminal branches of the circumflex nerve and vessels in the operation. In whatever way the resection may be performed the elevating function of the deltoid must be seriously compromised; for, even if the power of the muscle were wholly retained, it would fail to exert it as an elevator, because the essential fulcrum on which that power was designed to act, namely, the head of the humerus against the glenoid fossa, has been taken away by the operation. And although the tendon of the coraco-brachialis, and the coraco-bicipital tendon, may acquire great power in fixing the humerus so as to allow the deltoid to some extent to exert its elevating influence, this extent must always be extremely limited, for they cannot act as efficient substitutes for the lost fulcrum. The loss of the elevating action of the deltoid must therefore be accepted, like the loss of the rotating power from the division of the muscular insertions into the two tubercles, as a necessary consequence of resection of the head of the humerus. But the holding, or supporting power of this muscle exerted upon the whole upper extremity owing to its position, its extensive origin, and the manner in which it embraces and protects the mutilated parts as well as its faculty of assisting in carrying the arm backwards and forwards, are all functions which may still remain, and serve to point to the great importance of preserving the integrity of its structures as fully as possible. The wasting of the internal fibres above noticed, however, seems a necessary result of resection by the single incision; but it has this compensating feature, that it is a less serious loss to the patient than an atrophied condition of the outer and posterior fibres would be, because the upper clavicular fibres of the great pectoral muscle can take the place of the inner deltoid fibres to a considerable extent in supporting the shoulder and drawing it forwards toward the chest.

The greatest length of bone removed occurred in Case No. 5, that of Private A. Law, 65th Regiment. In his instance the head, neck, and fragments of the shaft of the humerus nearly three inches in length, were taken away. The length of bone removed must therefore have been about four inches in all. It is stated that the progress of this case after the operation towards recovery was unchecked, and the results appeared as satisfactory as in any of the others. In the case of Serjeant McDonald, whose arm, after resection of the head and part of the shaft of the humerus is represented in the lithographs, a space remained destitute of bone above the upper end of the humerus for about two inches, the bone being replaced by ligamentous connexions. These cases strongly show that Mr. Guthrie's limitations of the practice of excision in gun-shot wounds to injuries of the head and neck of the bone is unnecessary, "If the splinters extend to the body of the bone," he writes "amputation should be performed; if it be confined to the head and neck of the humerus, incision ought to be practised."* Sergeant McD's. case particularly shows what immense strength and varied movements may be retained notwithstanding the absence of a considerable amount of bone in the place of the original shoulder-joint. The exact length of bone that can be resected with a reasonable hope of a satisfactory result hardly seems to be settled; but the rule laid down on the point by M. Baudens in his memoir, elsewhere quoted, seems to be a very safe guide to follow. It is to the effect, that when the lesion extends beyond the neck, the bone should not be divided beyond the insertions of the deltoid, pectoralis, and teres major, and the latissunus dorsi muscles, for on this condition alone can any movements of the arm be preserved. As the insertions of these muscles extend to a considerable distance, they may sometimes be partially removed and successful results be still obtained. I am by no means sure, however, that observance of the rule given by the same distinguished surgeon that resection should be absolutely confined to the lesion is attended with the most favourable results.

Professor Van Buren, of New York, has been kind enough to send me a photograph, nearly of full size, of the head, and *six inches* of the shaft, of a right humerus, which were excised during the present war in the United States, on account of a comminuted gunshot fracture, with a successful result. The wound was inflicted in action at Culpepper, on October the 11th, 1863, by a fragment of shell, weighing nine ounces, which lodged under the deltoid muscle. The patient is reported to have recovered "without a bad symptom, and with a very useful arm." It is to be presumed, from the length of shaft removed in this case, that all humeral movements must have been lost, and that the usefulness described refers to the preservation of the movements of the hand, wrist, and some of those of the forearm, when the limb is artificially supported. The portions of the bone removed are in the Army Medical Museum at Washington, to which they were presented by the operator, Surgeon D. W. Bliss, U.S. Volunteers. The head, neck, tubercles, and adjoining part of the shaft were entire; the comminution was chiefly effected in the lower half of the part of the humerus excised, but two fissures extended for some distance into the upper half. The questions might arise in this case whether, as the head, neck, and some distance of the shaft, as well as the principal vessels and nerves, were intact, a hope might not have been entertained of recovery without resection; or, resection being determined upon, whether it might not have been limited to the injured part of the shaft; but, under any circumstances, the case is of interest in showing the length of bone which may be resected with success. M. Baudens has mentioned an instance in which the head, neck, and upper part of a humerus having been fractured by gunshot, he had performed resection below the insertion of the deltoid muscle, and the patient recovered.† In this case, the arm remained suspended in the midst of the flesh, without articulation, and deprived of all movements of the shoulder; but the hand and forearm movements were preserved, and capable of being employed, when the arm was artificially supported. In such a case the only question could be between removal of the whole limb at the shoulder-joint, and resection below the insertion of the deltoid, with loss of humeral movements. And there can be little doubt that the possession of the impaired limb would be held by every one to be far preferable to its total absence.

The cases which have come under my notice would lead me to conclude, while admitting as a principle always to be followed that as much *uninjured* bone is to be preserved as possible, that a fair section of the shaft immediately below the limit of the lesion gives the patient a prospect of a more serviceable limb after recovery than simple excision of fragments or splinters which are detached or nearly detached. M. Baudens mentioned having removed in one case only half of the head of a bone in accordance with his rule just named The three preparations sent to Netley of the portions of bone resected in the cases of privates Grimes, Yates, and Holmberg, show that the resection was performed in each instance admirably at the limit of the termination of the lesion which had been done by the shot, no sound bone being unnecessarily sacrificed, and though in one of these cases, a large portion of the head from which a portion was splintered off might have been left in situ, I cannot think the result would have been so satisfactory as it has been with the injured portions wholly removed. The preparation in Private Doward's case does not show whether resection was performed, or only excision of the detached head; in the instance of Corporal Law it is stated that the splintered portions of the shaft were removed by cutting pliers.

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* Op. pic. p 224.

† Op. Cit., p. 13.

A question arises in studying these cases as to the proper treatment to be pursued on a long voyage having to be undertaken by men convalescing from the effects of resection of the shoulder after gun-shot wounds from the seat of war to the invaliding hospital in England. This necessity must frequently happen in the British service. In the six cases under notice the arms of the patients in whom the operation had been performed were closely bandaged to their sides, under their dress, as a precautionary measure against the falls and various accidents to which partially disabled and weakly men may be subjected on shipboard from the rolling and pitching of the vessel. Five of the six patients were apparently protected from direct injury by these means; or at least, their limbs met with no blow or other violence during the voyage home. The sixth patient (see Private Hannighan's case) did, however, fall, and the effects of the fall seemed to have been aggravated by the fixed condition of the limb; for the whole weight of the collision came upon the elbow without any power on its part of yielding or slipping aside from the blow. The man's impression was that if the arm had been in a sling outside his clothes, the force of the blow would not have been so severely felt. As a set off against the security from accidents which was obtained by the limbs being secured under the clothes to the body, must be noted the atrophy and loss of muscular strength which was found to be the result of the long confinement and disuse of the limbs, in consequence of the bandaging, when the patients landed at Netley. Under all the circumstances, it appears to me that a better plan in such cases would be for the arms to be supported during the voyage in the ordinary way by suspending the forearm in an appropriate sling outside the clothes, and under the directions of the surgeon in charge, for a certain amount of passive motion of all the joints to be carried out regularly morning and evening in the sick bay, or at such other times as the surgeon may appoint, whenever the weather permits. The thickened and weak tissues of the arm might also have the benefit of shampooing and daily sea-water bathing. When not undergoing the treatment named, the arm might with advantage, perhaps, be not merely suspended by the arm sling, but might also be padded and secured, both arm and forearm, to the side in whatever way might be most convenient, so as to obviate the risks of collisions with the various objects which the movements of the vessel may render the patient liable to come into contact.

The average length of time passed by the patients in the Royal Victoria Hospital was between five and six weeks. The desire of the men to return to their homes, and the fair way they were then evidently in for gaining still further improvement and power in the use of their arms, which of necessity would be a process extending over a considerable period, rendered it unadvisable to detain them longer. It was remarkable how great the improvement was in the time named after discarding the restraints to which the limbs had been so long subjected, and from the careful application of regulated movements of their several structures. One patient only, Private Hannighan, was detained for a comparatively long period in hospital, namely, for sixteen weeks, on account of the additional injuries he received on board ship, and of other circumstances which will be found detailed in the history of his case.

The histories of the six resections referred to in the previous remarks now follow. They are given as completely as the available materials will permit. The accounts of the early periods of the injuries and their treatment sent with the men from New Zealand were only abstracts, and furnished very limited information respecting them; but these records have been supplemented, as far as possible, by careful questioning and examination by myself of the patients at Netley, and by observations of the principal parts removed in the operations. Assistant-Surgeon W. Jobson, M.D., also made careful notes of the cases in the hospital case-books while the patients were at Netley.

Case No. 1.—No. 3,008, Private J. Doward, 1st Battalion 12th Regiment, aged 29 years, of ten years service, was admitted into the Royal Victoria Hospital on the 21st of July, 1864, suffering from the effects of resection of the head of the right humerus, performed in consequence of a gunshot wound. The patient received his wound in action at Rangiriri, New Zealand, on November the 20th, 1863, and arrived at the Queen's Redoubt field hospital on November the 22nd. The projectile, a musket ball, entered from behind on the inner and back part of the arm, about two inches below the angle formed by the posterior folds of the axilla. There was no wound of exit.

The man was in a stooping attitude, taking aim, at the time he was struck, and, as subsequently shown, the projectile passed upwards and forwards from the point at which it entered until it lodged in the humerus just below the anatomical neck. Being hit from behind, the patient was unable to say from what distance the ball which struck him was discharged. A considerable amount of constitutional disturbance ensued, with much swelling of all the structures around the joint. Subsequently fracture near the articulation was diagnosed, and it was then determined to make an exploratory incision down to the head of the bone, and to resect it if necessary. This exploration was made on December the 8th, 1863, being the 18th day after the receipt of the wound, by Surgeon Mackinnon, 57th Regiment, when a transverse fracture was found to exist below the anatomical neck. A round ball was also at the same time found imbedded in the bone on its inner side, just below the seat of fracture. (See description of the head of the humerus and projectile at the end of the report of this case.) The head of the humerus was at once excised, and several loose spiculæ of bone were extracted. The long tendon of the biceps muscle was uninjured. The operation was borne well, and much relief was experienced by the patient, both locally and constitutionally, for some days afterwards. The progress of the case towards recovery subsequently became retarded by the formation of several abscesses posteriorly; and at one time it was thought that inflammation of the whole shaft of the humerus would ensue. By free incisions, however, to evacuate pus as soon as its existence could be ascertained, together with the aid of the internal administration of the sesquichloride of iron and other tonics, improvement was gradually effected, and about the middle of February a most beneficial change had occurred in all respects. On the 24th of February, 1864, when the patient was about to be discharged from the Queen's Redoubt field hospital, in which he had been treated, Staff Assistant-Surgeon Watson reported—"The wounds have now all healed, though occasional deep-seated pain gives rise to apprehension that further mischief may occur. The patient's general health, which has been much disordered throughout, now seems re-established."

Private D. did not improve during the voyage from New Zealand to England; on the contrary, from his own report, and from the contrast between his condition on his arrival at Netley in July, and his state of health noted on the 24th of February by Assistant-Surgeon Watson, it was evident that he had gradually retrograded constitutionally, and that the shoulder was also in a less satisfactory state than when he left the Queen's Redoubt Hospital. He was weak and anæmiated, and was in the habit of resorting to opiates at night to allay irritation, and to procure sleep. He experienced pain at the upper part of the humeral region, and also deep-seated pain at the inside of the elbow-joint. There were openings, surrounded by fungous granulations at two spots, in the line of the incision made at the time the resection was performed, and from these a considerable amount of thin unhealthy purulent discharge exuded. Another opening existed at the back of the shoulder connected with a sinus, from which a similar discharge was oozing; this opening corresponded with the original wound of entrance made by the projectile. Rough bone could be felt on examining with a probe, both through the opening just named, and through one of the openings in front. The arm had been bandaged to the side, and the forearm equally closely secured under his clothes across the chest during the whole voyage from New Zealand to England; no passive motion had been employed. On examination, there was found to be comparatively little deformity about the region of the excised joint. The recovery of motion in the injured joint, and, indeed, of usefulness in the whole of the injured limb, had been evidently seriously delayed by inferior dietetic and hygienic conditions incidental to living on board ship, and by the restraint to which the arm had been subjected during the long period passed at sea. The patient himself had scarcely any power of motion at the shoulder in any direction. The arm could be moved backwards and forwards passively at the shoulder to some slight extent, but scarcely any movement at all could be effected on trying to abduct the arm even passively from the man's side. The motions of the elbow-joint, wrist, and hand, as well as the actions of pronation and supination of the fore-arm, were found to be passively tolerably free; but all the parts were so weak from disuse, that the patient had himself scarcely any control over them. The coracoid process was not at all prominent, and in this respect the case differed from most, if not from all, of the other cases in which the long tendon of the biceps had been destroyed.

After the patient's arrival at Netley, the bandages and other restraints to which the limb had been subjected during the voyage were removed, and the fore-arm simply suspended in a sling, carried outside the clothes, from the neck. Frictions of the forearm and hand, with careful daily passive motion at the shoulder, were enjoined, at the same time that tonics, stimulants, and generous diet were ordered for the purpose of improving the general health. Under this treatment the patient soon began to improve in all respects. At the commencement of August a small sequestrum was removed from the wound of entrance at the back of the shoulder. The improvement steadily continued, and at the end of August, shortly before the man's discharge from the Royal Victoria Hospital, I made the following notes on his condition:—"30th August, 1864. The wound of entrance is now completely and firmly cicatrized. A small piece of bone, half an inch in length by a quarter in width, has made its own way out of the only opening which remains, *i.e.*, at a point about the juncture of the middle and lower thirds of the operation wound, and the arm has felt easier since. The patient still feels a pricking pain, however, on pressure, about the upper end of the shaft of the humerus, but no more necrosed bone can be felt by the probe. He has gained considerable power over the whole arm during the last fortnight. He can bend the fore-arm on the upper arm nearly to an angle of 45°. He cannot yet straighten the arm beyond an angle of 80°, owing to limitation of movement at the elbow-joint, but he is gradually regaining the lost power of movement at this articulation. The patient has now good grasping power of the hand; the power of pronation and supination, as well as the wrist movements, are perfect. The coracoid process now appears to be rather enlarged. The patient's power of moving the arm away from the side is still very limited, but he seems to be slowly acquiring some elevating power, as well as an increase of control over the lateral movements of the limb backwards and forwards. The arm will gradually gain greater strength, and will be in all respects a very useful limb."

Private D. was discharged as a pensioner on the 6th September, 1864, to his place of residence at No. 1, Queen's Terrace, Broadway, Hammersmith.

Description of the Head of the Humerus excised in Private D.'s case, with the projectile in situ, forwarded by Surgeon Mackinnon, 57th Regiment, to the Museum of the Army Medical Department at Netley.

The preparation consists of the head, anatomical neck, greater and less tubercle, of the right humerus, and an irregular splintered portion of the shaft, corresponding with the seat of fracture by which the parts above mentioned were separated from the rest of the bone. The projectile, originally a round ball, of the size usually employed by the Maories, is much altered in form. It has apparently struck the bone slightly from below upwards, and has penetrated immediately below the anatomical neck, behind and directly opposite to the situation of the bicipital groove. Had the ball passed completely through the bone, it would have made its exit through the bicipital groove in front. The ball has cut out and driven before it a fragment of the hard circumferential part of the bone into the cancellated structure; and one of the sharp edges of this portion has nearly cut the ball into two parts while being thus compressed. The ball has thus become spread out and considerably flattened, and to this circumstance its lodgment is probably principally due.

The specimen is of much interest, for it well illustrates a fact which is often observed in these injuries, and one which is sometimes turned to a practical account in deciding the nature of the surgical interference to be adopted in certain cases. It is the following. When a projectile strikes the bone below the anatomical neck, the splintering does not extend upwards into the spongy head of the bone, but the fissures are chiefly directed downwards. This is the more marked if the wound has occurred in a young soldier. In like manner observation of other specimens shows that if the spongy head be struck fairly above the anatomical neck by a projectile impinging laterally or superiorly the fissures do not usually extend below the neck; while if a bullet impinges on either of the tubercles, or in any part of the groove which forms the anatomical neck, then fissuring both of the head and the shaft is the usual consequence. In the present instance, the articulating head, neck, and tubercles, of the bone removed from Private D. are quite entire, but the fissuring had evidently extended downwards, perhaps, to a considerable distance. Hence probably the great constitutional irritation, the formation of abscesses pointing on the posterior part of the arm, and all the symptoms which led those who treated the case at one time to suppose that the whole humerus was in a state of inflammation; the subsequent formation and elimination of the necrosed sequestra were also probably due to the same cause.

It appears from the history of the case sent from New Zealand that at the time the head of the humerus was excised, several loose spiculæ of bone were also extracted. These fragments were not forwarded with the head of the bone above described. It is not anywhere stated whether any portion of the shaft was resected by the saw, and it seems probable that in this instance the operation was confined to simple excision.

Case 2. No. 3793, Private T. Grimes, 40th Regiment, aged 27 years, of nine years' service, was admitted on the 21st of July, 1864, at the Royal Victoria Hospital, suffering from the effects of resection of the head of the left humerus after a gunshot wound.

This man was also wounded at Rangiriri on November the 20th, 1863, by a musket shot. The bullet, as shown by the cicatrices, entered the front of the left shoulder, one inch and a half below the acromion process and immediately external to the coracoid process of the scapula. It seems to have travelled inwards and backwards, lacerating the long tendon of the biceps muscle and fracturing the head of the humerus in its passage; then to have passed across the lateral wall of the chest for a short distance, and to have penetrated the dorsum of the scapula; and finally to have emerged about half an inch below the spine and three inches from the posterior border of the scapula. When the patient was first seen at the Queen's Redoubt field hospital the tumefaction was so great that no distinct diagnosis of the nature of the injury could be arrived at; but subsequently, it having been determined that fracture into the joint existed, it was resolved after consultation to perform the operation of resection. This was carried into execution on December the 4th, by an anterior incision extending for about five inches, and including the wound of entrance of the projectile. A longitudinal fissure through the head, and extending down to the surgical neck, of the humerus, was found to exist, while a fragment was also found detached from the outer side of the head and upper part of the shaft of the bone. These injured parts were sawn off, so that altogether about two and a half inches of bone were removed by the resection. Although the tendon of the long head of the biceps muscle had been much lacerated by the injury, sufficient was preserved to afford hopes that its action might be saved. The operation was borne well, and no untoward symptoms arose in the progress of the case. At the date this patient quitted the field hospital, Assistant-Surgeon Watson remarked at the conclusion of a brief history of the case that "the wounds have healed soundly, and the man has some power over the arm which is gradually increasing." The patient, however, did not appear to have made much progress in recovery after leaving the field hospital so far as the movements of the upper arm were concerned, but there was a moderate gain of strength in those of the forearm and hand. On examination of the injured shoulder at Netley, there was found to be considerable depression in the situation of the joint, with marked prominence of the coracoid and acromion processes. The appearance of the excised joint was not unsatisfactory otherwise than in the great wasting of the surrounding muscles, especially of the deltoid and biceps muscles. The only comfortable position for the arm the patient stated to be that of close proximity to the side of the chest. This was evidently in a great degree due to the fact of its having been retained in that position by bandages during the whole period of the voyage from New Zealand. When the arm was in the position named, the forearm could be flexed so that the hand could touch the chin. Whenever an attempt was made on the patient's part, or by passive motion, to remove the upper arm away from the side of the chest, the limb quivered and trembled, and the attempt gave rise to great pain.

The patient, although a spare man, appeared to be in a good state of general health.

Private G. was discharged as a pensioner, on the 24th of August, 1864, to his place of residence at Naas, Kildare, Ireland.

Description of the preparation of the Head and portion of the Shaft of the Humerus resected in the case of Private G., and forwarded by Surgeon Mackinnon, 57th Regiment, to the Army Medical Museum, at Netley.

The specimen consists of the greater portion of the head and neck, and one inch and a half of the shaft of a left humerus. The smaller tubercle is entire; the inner portion of the larger tubercle, that bordering on the bicipital groove, alone remains. The parts of the head and neck which are wanting appear to have been grazed off by the projectile which inflicted the wound; they comprehend the whole of the outer aspect of the bone and extend in depth to about one-sixth of its whole width. A superficial portion of the hard circumference of the shaft is shown to have been carried away at the same time as the parts above named.

The projectile evidently came first into contact with the larger tubercle. A portion of the curved outline of the opening made by the projectile is still seen at this point, and from it the chief injury to the bone extends. The cancellated structure is here much bruised and shattered. Three fissures are also seen in the specimen to radiate from this same position. The uppermost fissure follows the direction of the anatomical neck, across the upper part of the bicipital groove and above the lesser tubercle; a second descends through the large tubercle itself; the third, the most extensive and important, passes obliquely downwards and completely across the bone, separating what remains of the head, neck, and tubercles from their connexion with the shaft.

In this case the saw has been employed to resect the injured portions from the shaft, and the line of the saw has skilfully just cleared the lowest point of the third fissure above described. There is every reason to believe that no fissuring extended into the portion of the humerus which was left in the arm of the patient. The measurement from the upper surface of the head of the bone to the line of resection is exactly two and a half inches.

No smaller fragments accompanied the specimen.

Case 3. The history of the earlier period of this case, viz., the period while he was a patient in the field hospital at the Queen's Redoubt, is transcribed from a report by Staff Assistant-Surgeon E. M. Shane, forwarded with the patient.

"No. 273, Corporal N. Holmberg, 40th Regiment, aged 27 years, of five years' service, a robust subject, was wounded by a musket bullet in the right shoulder, at the attack on the Redoubt at Rangiriri, on the 20th of November, 1863. He was admitted into hospital here (Queen's Redoubt) on the 22nd of November. The ball entered anterior to, and near to the outer extremity of the right clavicle, just below the level of the acromion process;

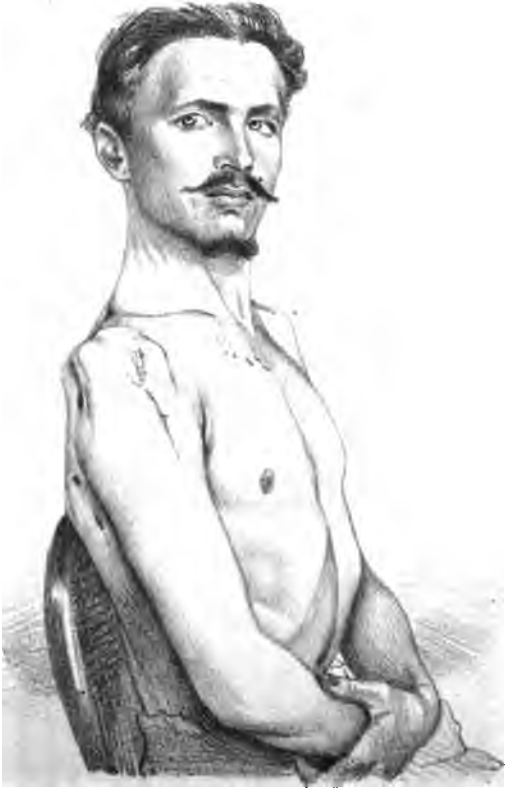
passed backwards and a little downward; and made its exit through the deltoid muscle, about four inches from its entrance, and about the same distance above the posterior fold of the axilla. There was great pain in any movement of the arm, and partial paralysis of motion, but not of sensibility. Neither the joint nor bone was thought to be injured in the first instance. The discharge from the wounds was copious and healthy; and in it, on the 5th of December, a small fragment of bone was noticed, and again, on the 8th December, another portion was found protruding from the posterior wound. From these circumstances, and from a careful examination of the joint, the head of the humerus was diagnosed to be injured; and it was decided to perform the operation of resection. The operation was performed on December the 10th, by a single longitudinal incision, about three inches long, passing downwards from the edge of the acromion process and afterwards extended a little upwards. The deltoid muscle was divided down to the joint, when the capsular ligament was found to have been opened by the projectile, the long tendon of the biceps destroyed, and the head of the humerus fissured opposite to the wound of entrance, and thence as far down as its anatomical neck. The bony tissue was disintegrated near the fissure, and ulceration of the cartilage had also begun to spread from its borders. The operation was conducted after the usual manner. By the end of December the patient was in a state of great debility, and there was œdema of the feet. Abscesses formed near the acromion and were opened. From that period to the present date (22nd February, 1864) he has improved greatly in general condition. It is now 74 days after the operation, and the wounds are almost completely healed; the discharge is very trifling; there is no tenderness or pain about the shoulder, which he can move up and down; and, in fact, the case has progressed most satisfactorily."

"He was treated by anodynes at first to procure rest, and, as his strength failed, by the early exhibition of stimulants and a liberal allowance of nourishment. His strength was also supported by quinine, iron, and cod liver oil. Locally, when suppuration was copious, poultices were used, but afterwards water-dressings. Tents were employed to prevent the surface of the incision from healing, and latterly the wound of operation has been injected daily with a weak solution of Condy's fluid before dressing it, and the same fluid has been applied to the surface by means of lint."

This patient, a Swede by birth, of phthisical aspect, and presenting signs of condensation at the apex of the right lung, but, according to his own statement, never having suffered from chronic cough, was admitted with the others into the Royal Victoria Hospital on the 21st of July, 1864. On removing the bandages, the muscles of the injured right arm and forearm were found to be much wasted, owing to the prolonged disuse and the effects of the restraint to which they had been subjected. There was great absence of power of movement in any part of the arm or forearm; and even the weight of the arm itself, when permitted to hang down by his side in a state of quiescence, gave him considerable pain. The cicatrix of the wound of entrance on the outer side of the coracoid process was strongly marked, as was also that of exit on the posterior aspect of the shoulder just below the outer part of the spine of the scapula and close to the axillary border of that bone. The cicatrix of the incision was seen to extend from the anterior aspect of the point of the shoulder about four inches down the arm. No remains of the long tendon of the biceps muscle could be detected. The coracoid process was extremely prominent, and so large that one was almost led to doubt that the projection really consisted only of this process itself. Stretching downwards from this prominence, in the depression resulting from the loss of the excised joint, the tense hard tendinous fibres of the short head of the biceps muscle could be plainly felt. There was considerable wasting of the deltoid muscle, especially of that part of it anterior to the line of incision. A fixed hard process of bone could be felt just beneath the acromion, which, at first gave rise to some difference of opinion as to its nature and origin.

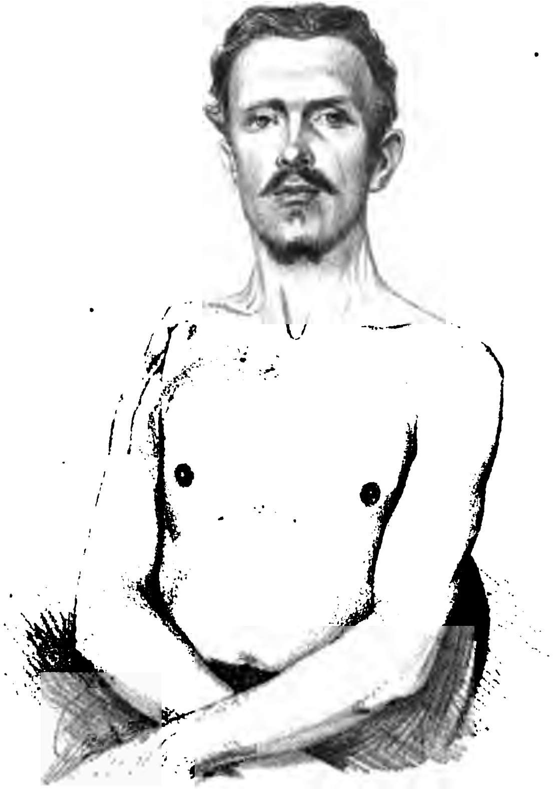
This patient quickly improved under the same treatment as was adopted in the previous cases, *i.e.*, comparative freedom of the limb, with careful and moderate occasional passive motion. After a short time he could not only bear without inconvenience the weight of the arm hanging extended by his

N° 7.



Case of Nicholas Holmberg, 40th Regt. The Drawing shows the relations of the wounds of entrance & of exit of the projectile; the cicatrix of the resection incision; the enlargement of the coracoid process, and the relative positions of the fractured acromion & the scapular end of the clavicle.

N° 8.



Day & Son (Limited) Lith.

Case of Nicholas Holmberg, 40th Regt. The Drawing shows the scapular end of the clavicle forming the point of the shoulder instead of the acromion, and affords a front view of the enlarged Coracoid process.

side, but he gained so much muscular strength that he was enabled to flex the elbow, and bring the forearm up to a right angle with the upper arm. He was afterwards soon able, when the forearm had been brought to right angles with the humerus, freely, although with a slow action, to flex it still further, so as to touch his chin, and even his forehead on bending his neck downwards. He could also pronate and supinate his hand with the arm in the semi-flexed position, as well as draw the humerus backwards and forwards to some extent, but the latter movements caused pain. He failed, however, to acquire any power of lifting the arm from the side by acting on the new shoulder joint.

On the 30th of August, 1864, after a careful examination of this patient, I noted the following remarks:—"Grasping power of hand increasing greatly in strength. Wrist movements, pronation and supination of forearm and hand complete. The patient can straighten the arm to its full natural extent. He can also flex the forearm on the upper arm, so as almost to touch the shoulder, and quite to touch the clavicle near its sternal end. The power of advancing the upper arm forwards, and of drawing it backwards, is also improving gradually. The acromion process was evidently broken by the ball in its passage, and it seems strange that this was not noticed in the early history of the case. The "point" of the shoulder is now formed by the scapular end of the clavicle, instead of by the acromion. On following the spine of the scapula with the finger, we come to the broken acromion process, which is on a level beneath the end of the clavicle before mentioned. Part of the acromion process has been bent downwards, and remains firmly fixed and anchylosed, nearly at right angles, with the part of the acromion which remains in its normal relation to the spine of the scapula. It is probable that the bullet, immediately after its entrance, struck the under surface of the acromion process, producing the fracture, and that to this circumstance was chiefly owing the change in direction of the line in which the bullet was at first travelling. Just behind the end of the clavicle, above the spine of the scapula, and about two inches above the wound of exit of the ball, is a cicatrix of an incision which was made to evacuate an abscess. The patient informs me he was standing about six yards only from the man who fired at and struck him."

This patient was detained some time in hospital, owing to certain difficulties in sending him to his residence at Gothenberg, in Sweden. He was finally discharged as a pensioner on the 8th of December, 1864.

The fracture of the acromion, the manner in which the fractured margins had become joined, their position, the marked enlargement of the coracoid process, and especially the fact of the point of the new shoulder being formed by the end of the clavicle, were such peculiar and interesting features in this case, that I thought it important to preserve photograhic representations of the external aspect of the parts. The following lithographic portraits are taken from the photographs, and though on a small scale, sufficiently indicate the leading features above mentioned. (See Lithographs Nos. 7 and 8.)

Description of the Head and Neck of the Humerus removed by resection from Corporal N. H., 40th Regiment, by Assistant-Surgeon Dempster, and forwarded by Surgeon Mackinnon, 57th Regiment, to the Army Medical Museum, at Netley.

The specimen consists of the head and neck of a right humerus, with a very small portion of the shaft on the outer side below the greater tubercle.

In this case the ball has struck directly against, and grooved the superior margin of the greater tubercle, and has partly involved the upper margin of the bicipital groove. It has split off the remaining portion of the great tubercle from the rest of the head, by a fissure which descends at its lowest point to nearly an inch below the protuberance. Above the point of impact there is a pit or hollow, from loss of some of the cancellated structure of the head, as if the bullet had indented it; but this, I am informed by letter, did not originally exist, but occurred accidentally in making a dry preparation of the bone in New Zealand. When first removed there was simply the grazing of the large tubercle, and of the surface of the bone immediately above it, as well as the fissure before named descending from the point of impact. The remainder of the articulating surface, the smaller tubercle, and the greater part of the neck are entire.

The specimen has been removed by resection, and in this case again the line of section by the saw has just cleared the limits of the fissuring. On the inner aspect the section has been made close up to the smaller tubercle, and to the groove constituting the anatomical neck of the bone.

Case No. 4.—Private J. Yates, 1st Battalion 12th Regiment, aged 23 years, of five years service, was admitted into the Royal Victoria Hospital on July the 21st, 1864, suffering from the effects of resection of the head of the left humerus, consequent upon a gunshot wound of the shoulder-joint.

Private Y., a man of rather a scrofulous diathesis, was wounded in action at Rangiriri on the 20th November, 1863, by a musket ball, which entered on the anterior and upper aspect of the shoulder, about one inch and a-half below the acromion process, passed obliquely inwards, and lodged. He was received into the General Field Hospital on November the 22nd. The projectile was discovered and extracted seven days afterwards, by an incision through the integument and superficial structures, close to the spinous process of the first dorsal vertebra. Much swelling and pain occurred after the receipt of the injury, and after a time, the patient's health began to suffer from constitutional irritation. The bone was not suspected to be injured at first; but on the 10th of December, twenty-one days after the wound, the nature of the injury became apparent, and it was resolved to perform the operation of resection. On the 12th of December, the joint was cut down upon by Surgeon Mackinnon, 57th Regiment, the incision being about four inches in length, and immediately over the bicipital groove, when the head and neck of the humerus were found to be split completely through and otherwise injured. The fractured bone was then removed, about three inches altogether being taken away. The long tendon of the biceps muscle was lacerated, and much general injury existed in the soft tissues round the joint. Feverish symptoms continued for some days after the operation. Subsequently a large abscess formed at the root of the neck, near the point of entrance of the bullet, at the outer end of the clavicle, which was opened, and continued to discharge profusely for some period; and at another time some pneumonic symptoms excited uneasiness, but on the whole the case progressed favourably. On the 1st of March, 1864, Staff Assistant-Surgeon J. Watson reported:—"Private Y.'s health is now quite restored, and the amount of power which he even now possesses gives hopes of a comparatively useful limb."

As in the instances of the other patients, when the bandages which had confined this patient's arm to his side and chest during the voyage, were removed, he was found to have very little power over the injured limb. The muscles of the forearm, as well as those of the humeral region, were considerably atrophied. Pronation and supination of the forearm, and flexion of the elbow-joint could be passively performed without any impediment. His general health was good. Under similar treatment to that pursued in the other cases, viz., causing the arm to be worn in a loose sling outside the coat, subjecting the joints to passive motion, repeated at frequent intervals, but only for a short period on each occasion, and encouraging efforts, on the part of the patient to make use of the several muscles of the limb, the movements of the forearm and hand were gradually restored, and some of the humeral movements much improved. The pectoralis major particularly recovered power in drawing the arm towards the chest, and within the third week after admission he was able to touch the top of his head with the hand of the injured arm, by assisting the movement with the hand of the opposite side.

The portion of the deltoid muscle, anterior to the line of incision, remained much wasted; but its middle, or vertical portion, were increasing in development and strength when the patient quitted Netley, contemporaneously with the recovery of tone in all the other muscles of the injured limb.

In this case the bullet, after traversing the shoulder-joint, evidently passed between the scapula and the posterior wall of the chest. There was no hæmoptysis, however, after the injury, and percussion, as well as auscultation of the left side of the chest at Netley, elicited no abnormal sounds.

Private Y. was discharged from Netley, a pensioner, on the 22nd August, 1863, to his residence at Manchester.

Description of the Head, Neck, and Portion of the Shaft of the humerus, removed by resection from Private J. Y., 1st Battalion 12th Regiment, and forwarded by Surgeon Mackinnon, 57th Regiment, to the Museum of the Army Medical Department, at Netley.

The specimen consists of a portion of the head, neck, and of about three-quarters of an inch of the shaft of a left humerus. The greater part of the upper aspect of the articulating service is wanting, and a portion of the greater tubercle.

The projectile has first come into contact with the upper part of the greater tubercle where it borders the bicipital groove, and has passed, rather slantingly upwards, through the joint, carrying off the surface of the head of the bone as it coursed along. A curious complication was caused by the collision of the ball with the great tubercle. A triangular portion of the process was struck off and driven down into the cancellated structure of the articulating head as the ball glanced onwards, and this fragment, acting as a wedge, split the head into two nearly equal portions. The lowest point of this split descended to three-quarters of an inch below the level of the smaller tubercle.

Resection of the fractured head has been performed by the use of a saw, and the line of section has been adroitly carried precisely through the part where the splitting above mentioned terminates, and, therefore, through unwounded structures. The remaining portion of the humerus would be necessarily quite free from fissuring.

The distance on measurement from the line of resection to the upper portion of the head in the specimen is one inch and three-quarters.

Case No. 5.—No. 2,164, Private A. Law, 65th Regiment, aged 37 years, of nearly 20 years' service, was admitted on the 21st of July, 1864, at Netley, for the effects of resection of the head of the right humerus, consequent on a gun-shot wound.

Private L. was wounded in action at Rangiriri on the 20th of November, 1863, by a bullet which entered on the anterior aspect of the shoulder, and made its exit posteriorly and nearly opposite to the point of entrance. He was admitted at the Queen's Redoubt field hospital on November the 22nd. At first it was thought that the projectile had only traversed the soft parts without opening the capsule or injuring bone. The reports state that eleven days after the injury, the dingy sero-purulent character of the discharge showed that the joint had been injured, and that this was confirmed by loose pieces of bone being detected by the probe. Resection of the head of the humerus was performed on December the 9th, nineteen days after the date of the original injury, by Surgeon Mackinnon, 57th Regiment. The steps of the operation were rendered difficult by the great shattering of the head of the bone which was split into several fragments, as well as by the splintering of the upper part of the shaft. The long tendon of the biceps muscle was found to have been divided by the bullet. The detached pieces of bone were extracted, fragment by fragment, and several splinters were cut away by aid of the bone forceps. Altogether about three inches of the upper part of the humerus were removed. Assistant-Surgeon Watson states in the history of the case sent with the man from New Zealand, that "the progress of the case after the operation towards recovery was unchecked. Scarcely any constitutional disturbance occurred. A healthy granulating process commenced and continued throughout. The bullet wounds healed up before cicatrization commenced in the operation wound. Scarcely any power now exists over the upper arm, but the fingers and wrist are becoming gradually more flexible. His general health is good." This report was dated the 24th October, 1864. This patient, on his arrival at Netley, like his comrades, exhibited the effects of the long-continued bandaging, and disuse of the arm, in a generally atrophied and powerless condition of the muscles of the limb. About three weeks after his admission, the following account of the appearance of the shoulder, and of the general state of the arm, was noted by Assistant-Surgeon Dr. Jobson, "The cicatrices of the original wound are situated on the front and back of the right shoulder, about two inches above the anterior and the posterior commissures of the axilla. The anterior cicatrix is the larger, and is not adherent; the posterior is puckered and depressed. The excision of the joint has left a perpendicular cicatrix extending about five inches down from the anterior part of the acromion, and about three-quarters of an inch external to the anterior wound of entrance. The coracoid process is immediately to the inner side of this wound. It is prominent, and from it the tense short head of the biceps muscle can be felt passing down the arm. The end of the humerus is felt about two inches from the acromion process, and any movement of the arm which presses this end forwards upon the skin or inwards amongst the nerves causes pain. There is considerable atrophy of the muscles of the injured arm; but the patient states that their tone and bulk are increasing rapidly. There is no general anæsthesia of the arm, nor tingling sensation, although slight numbness is complained of, extending along the inner aspect of the arm as far as the elbow. He can flex the arm from a very obtuse angle up to his chin and mouth; but he cannot completely extend it so as to let it swing at full length by his side. He cannot raise his elbow from his side, so as to extend the shoulder at an angle with the chest. He has full power over all the other articulations of the limb. The portion of the deltoid muscle anterior to the longitudinal incision appears especially atrophied."

This patient left hospital within five weeks after his admission, being discharged on the 22nd of August to his home at Castlebar, County Mayo, Ireland.

Description of the broken portions of the Head, Neck, and part of the Shaft, of a right Humerus, removed from Corporal A. L., 65th Regiment, and forwarded by Surgeon Mackinnon, 57th Regiment, to the Army Medical Museum at Netley.

The fragments in this case sent are eight in number. The head of the bone is divided into four portions. A fifth fragment consists of the lower segments of parts of the two tubercles, with a corresponding portion of the bicipital groove between them; the three remaining portions belong to the shaft. No evidence remains of the precise situation at which the bone was struck by the projectile; but as the long head of the tendon is stated to have been divided by the projectile, and as an inch of the bicipital groove remains entire in one of the fragments above mentioned, it was probably struck between the two tubercles, and at the upper aspect of these protuberances.

One of the splintered portions of the shaft is only one-eighth of an inch less than three inches in length, and the length of a second is two inches and three-quarters. The extremity of one fragment bears evidence of the use of cutting forceps, by means of which it was resected from the remaining part of the shaft. It is remarkable that there should have been at any moment an uncertainty in the diagnosis of the nature of this case, as the bone was so extensively comminuted.

Case 6. No. 697, Private J. Hannighan, 2nd Battalion 14th Regiment, aged 24 years, of five years' service, was admitted into the Royal Victoria Hospital, on November the 21st, 1864, for the effects of resection of the head of the left humerus, consequent on gunshot injury. This patient was wounded at Rangiriri on November the 20th, 1863, by a musket bullet which struck the front aspect of the right shoulder, just above the anterior fold of the axilla, and one inch to its outer side, penetrated, and lodged. He was admitted into the General Field Hospital on the second day after the wound was received. There was very great tumefaction, and to this cause was chiefly owing the fact that the nature of the injury was not then ascertained. Thirteen days after the date of the original injury it was ascertained that the joint was implicated, and the head of the humerus fractured. Resection was then performed by Inspector-General Mouat, V.C., C.B., and about three inches and a half of the head and shaft were removed, the bone having been splintered to that extent. In the abstract history of the case sent with the man from New Zealand, and signed by Assistant-Surgeon Dr. Melladew, it is stated that "the bullet was ascertained to be imbedded in the soft parts in the axilla so close to the vessels that its removal could not be effected without great danger, so it was left to come away naturally." This, as will be seen subsequently, was a mistake; the supposed foreign body may, perhaps, have been a fragment of bone. Dr. Melladew writes from the Queen's Redoubt Hospital, on February the 24th, 1864:—"The subsequent progress of this case has been satisfactory on the whole, though there have been, from time to time, abscesses and constitutional disturbance, owing to the detachment of small splinters and comminuted pieces of bone due to the original injury. The operation wound has gradually filled up and is now closed, excepting a part not more than one inch and a half in extent corresponding with the situation of the wound of entrance. From this opening there still exudes a little healthy pus, and as the edges are fungoid, it is probable that more splinters are yet to come away. A second opening exists in the anterior boundary of the axilla from which a little pus comes away; it was made with the knife in searching for the bullet which was thought to be presenting there. The man's general health is at present very good." The condition of the long head of the biceps muscle is not mentioned in any of the reports of this case.

When this patient was admitted into the Royal Victoria Hospital on July the 20th, 1864, he was suffering greatly from pain and swelling of the injured arm, and from much constitutional disturbance. On examination, a large collection of matter was found to be occupying the situation of the cavity left by the resection and its neighbourhood. This was due to a fall he had on board ship about three weeks before he landed. He had slipped and fallen on his left side, and the weight of his body was brought to bear upon the elbow of the injured arm as it lay secured against the side of his chest. As soon as the patient had been put to bed and had properly rested, the abcess was opened, and ten ounces of pus were evacuated. This was rapidly followed by relief of all the patient's general symptoms. Shortly after admission also the wound of entrance of the bullet reopened, and the probe detected a sinus extending downwards and backwards with some rough bone at its extremity. No loosened sequestra were, however, found. The bullet still remained lodged, and careful exanination for a long time led to no discovery of the site of lodgment. It was ascertained that the man's left arm was elevated in the act of supporting his rifle whilst he was aiming, when he was struck by the bullet, which was fired from above and in front of the position where he was standing. According to the patient's statement the exploratory incision made on the pectoral wall of the axillary triangle was employed to evacuate an abscess and not to search for the ball, as stated in the abstract sent from New Zealand. This opening was not yet closed when the patient arrived at Netley, but had left a sinus whose orifice was on the inner wall of the chest two inches below the apex of the axillary space. When a probe was passed along this sinus, its progress seemed to be arrested by contact with indurated cellular and muscular tissues at a few inches distance from the orifice. The direction in which it passed most easily was backwards and downwards. Between the papilla at the opening of the sinus, and the axillary border of the scapula an extensively diffused swelling was found to exist over the wall of the chest, and, judging from the direction from which the ball was fired, the situation of the wound of entrance, the position of the patient's arm when he was struck, with the fact that the ball could not be discovered at the time of operation, there seemed no doubt but that this swelling was in some way due to the presence of the projectile. Occasional efforts were therefore made in this direction for the discovery of the projectile, and, at last, in September, a probe came into contact with it lying beneath the scapula on its pectoral aspect, and at a short distance above its inferior angle. A scale of lead was at first brought away by a pair of bullet forceps along the sinus, and through the opening at the margin of the axilla. The bullet itself was then grasped, but could not be extracted. Various kinds of extractors were employed, but with no success; the bullet appeared to be brought forward for a limited distance, and then to meet with some obstacle, which could not be overcome without using an unjustifiable amount of violence. The attempts at withdrawing it by the sinus were then abandoned; and subsequently an incision was made immediately below the lower angle of the scapula, and by passing the finger upwards, after some little effort it was removed. The difficulty which had been previously experienced was at once explained by examination of the bullet. The bullet, a rifle ball, and apparently an Enfield one, had been greatly altered in form. One portion was flattened and spread out like an extended wing, being prolonged for nearly three-quarters of an inch from the main part, and this portion had become fixed between the subscapularis muscle and the bone. The lead surrounding the hollow base of the projectile was marked with the indentations of the forceps by which it had been grasped in the unsuccessful attempts at withdrawing it through the axillary sinus owing to its flattened part having been held by the muscular fibres in the manner described*. It would have been better if these attempts had not been made but the incision at the inferior angle of the scapula adopted as soon as the site of lodgment had been discovered, for it afforded a favourable dependent opening for the escape of pus; but the circumstance of the bullet being so readily grasped by the forceps through the sinus, naturally led to attempts at taking it out in that direction. After the removal of the projectile the whole sinus rapidly closed, the axillary opening becoming first healed. The thickening of the tissues between the edge of the scapula and the axilla gradually disappeared at the same time.

On account of the circumstances before named, but more especially on account of the evidence of some necrosed sequestra requiring to be removed from the humerus, this patient was detained to a much later period than any of the others who arrived with him. It was not until the 21st of October that the last sequestra were sufficiently detached to be removed. Two spiculæ were removed on that date, both being portions of the tense outer cylindrical portions of the upper end of the shaft, and the larger of the two being one inch in length. No more necrosed portions could then be detected, and the healing process was no further interrupted.

On the 8th of November, 1864, the day before Private H. quitted hospital, I made the following notes on his condition. "The opening of entrance made by the bullet, as well as the openings made for the evacuation of the abscess, and for the extraction of the bullet below the scapula, are now quite healed. There is not much power in the deltoid muscle yet, but every prospect of fair development in future. Scarcely any of the origin of this muscle has been destroyed. The patient can now flex the forearm on the upper arm by its own muscular power to an angle of 135°. The stiffness which for some time existed about the brachialis anticus, and the body of the biceps muscles, as well as about the elbow joint, have disappeared. The coracoid process is much enlarged, though not so prominent as in some of the other cases, and the coracoid action of the biceps muscle has gained considerable power. There is no evidence of the glenoid origin of this muscle existing. The actions of the pectoralis major and latissimus dorsi muscles are much increased in vigour. The grasping power of the hand is now strong; the wrist movement, and the power of supination and pronation are complete. There is no sensation of numbness, or tingling of the arm or hand, which he says he suffered from for some time after the injury; but the temperature of the hand and forearm of the wounded side appears to be generally higher than that of the sound limb, and the skin of this region perspired more freely than elsewhere. Neither anœsthesia, nor hyperœsthesia, of its surface exit. The general muscular development of the arm is now fair, as shown by the comparative measurements of the sound and the injured arms."

Measurement of circumference of wounded arm four inches above elbow 11 inches; sound ditto 11½ inches; wounded arm three inches below elbow 10¼ inches; sound ditto, 11¼ inches.

This patient was discharged to his place of residence in the town of Kildare, Ireland, on the 9th November, 1864.

The bone removed in the case of Private H. was not forwarded to the Museum of the Army Medical Department.

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* The bullet is preserved in the Army Medical Museum.

CASE OF PENETRATING WOUND OF THE ABDOMEN, WITH EXTRUSION OF THE GUT. RECOVERY.

Extracted in abstract from the Annual Report of W. Pearl, Esq., Assistant-Surgeon, D Battery, 3rd Battalion, Royal Horse Artillery.

Gunner L. was gored by a bullock, walked several hundred yards to barracks with the assistance of a comrade, and was some time afterwards found lying drunk on the steps, and brought to hospital. When seen on the afternoon of the 20th June, 1863, the day of the accident, he was found to have a straight clean cut wound two and a-half inches long, situated about two inches above Poupart's ligament, and from which protruded nearly a foot and a-half of small intestine, dry, and of a dark-red colour, but—fortunately—otherwise uninjured. The wound internally extended upwards, four inches towards the internal ring; and the finger could be passed into the abdominal cavity. The gut was carefully, but with some difficulty, pushed back through this opening, and two stitches inserted at the outer wound.

Cold water dressing, and a pad and bandage were applied, and recovery took place within a month, without an untoward symptom.

ARMY MEDICAL SCHOOL.

A SHORT STATEMENT RELATIVE TO THE REMOVAL OF THE ARMY MEDICAL SCHOOL FROM CHATHAM TO NETLEY, TOGETHER WITH REPORTS RELATIVE TO THE SIXTH, SEVENTH, AND EIGHTH SESSIONS.

The Army Medical School was opened in October 1860, by the Right Honourable the Secretary of State for War, the late Lord Herbert, at Fort Pitt, Chatham,* being placed there for teaching purposes in connection with the principal invaliding hospital of the British Army. The school remained at this station during its first five sessions.†

Towards the end of the year 1862 it was decided by Her Majesty's Government that the Royal Victoria Hospital, the construction of which building was just completed, should be occupied by patients; that it should become the established hospital for the reception of all soldiers invalided from foreign stations; and that the chief part of the official business of invaliding, which had hitherto been transacted at Chatham and at Chelsea, should be transferred to Netley. This station was also ordered to be made the head-quarters of the officers of the Army Medical Department, and of the Army Hospital Corps.

These changes were accordingly effected in the spring of the following year—1863. The hospital at Fort Pitt was then closed, and the Royal Victoria Hospital occupied instead.

It was also determined that the Army Medical School should be transferred to Netley, and placed in connexion with the new invaliding hospital, in order to fulfil its primary object of affording practical instruction to the candidates for admission into the Army Medical Service.

It was found that the necessary accommodation could be obtained within the hospital itself if certain alterations in surbordinate parts of the building were permitted to be made. These alterations, which included the fitting and completing, with all necessary appliances, a laboratory for the practical study of hygiene capable of accommodating thirty-six gentlemen; a microscopical room also capable of receiving thirty-six gentlemen; a lecture-theatre with seats for an audience of one hundred and twenty; offices for the professors, &c., were at once sanctioned by the Secretary of State for War; and they were so far completed by the 15th of April, 1863, that the sixth session of the school was opened on that day at Netley by Deputy-Inspector-General Thomas Longmore, Professor of Military Surgery.

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* For an account of the opening of the Army Medical School, see the previous volume of Reports for 1859, published in 1861, p. 342, &c.

† The work done during these sessions will be found recorded in the volumes of Reports for 1860, p. 478, and for 1862, p. 556.

The valuable museums and library beloging to the officers of the Army Medical Department were also removed from Fort Pitt to Netley, where suitable accommodation has been, or is in progress of being, provided for their preservation; and these, together with the library of the Army Medical School, which is gradually extending, offer important means for illustrating the lectures and aiding the work of instruction carried out at the school.

Arrangements were at the same time made by which recruits should be sent from the neighbouring district to Netley for the instruction and practice of the medical candidates in the examination of those men as to their fitness or unfitness for military service, thus obviating the inconvenience of Netley being unconnected with a garrison, so far as the opportunity of training the medical candidates in this duty is concerned.

As already stated, the sixth session of the Army Medical School commenced on the 15th of April, 1863. It terminated with the usual examination in August, 1863.

This session was attended by fifteen candidates.

The seventh session, viz., the winter session of 1863-64, was attended by thirty-three, and the eighth, or summer session of 1864, by thirty-nine candidates.

All these candidates, after previous competition for admissions to the school by public examination at Chelsea, established their claim to the order of precedence, in which they were eventually gazetted, by further competitive examinations at the close of each session at Netley.

The questions put by the examiners at Chelsea and Netley respectively, and the combined results of the numbers gained by each candidate at both examinations, are given below.

CHELSEA EXAMINATION, FEBRUARY, 1863.

ANATOMY AND PHYSIOLOGY.

1. Describe the membranous portion of the urethra, its form, relations, and structure.

2. Describe the parts, as displayed on dissection, contained in the space bounded by four lines corresponding to the borders of the masseter muscle, proceeding from the surface inwards.

3. Point out the situations of the ganglia of the sympathetic in the head and neck, and describe their connexions with other nerves.

4. Describe the human blood, its physiological, physical, and chemical properties; the mode of development of the corpuscles; and mention the distinctive peculiarities of the blood in various other mammals, in birds, fishes, and reptiles.

5. Describe the mode of development of a vertebra in general, noticing also those vertebræ (not including the sacrum and coccyx) which appear the most exceptional to the common plan.

6. Point out the homologies between the bones of the anterior extremity of a horse and of an ox, and those of the upper extremity of man.

SURGERY.

1. Describe the ordinary characters of cancer of the tongue, and the means of distinguishing it from other growths and ulcers of the same organ.

2. State any rules that you would generally observe in regard to the opening of certain abscesses, as soon as the presence of pus is ascertained, and the leaving of others till they point or spontaneously discharge.

3. State your opinion on the question, whether, in diseases of the knee-joint, excision of the articular parts of the bones is to be preferred to amputation; give reasons for your opinion, and indicate the cases, if any, in which you would prefer excision.

4. Name three of the best means (not including the ligature) for arresting hæmorrhage from small blood-vessels recently divided; state the means of employing them, and the cases to which they are severally best suited.

5. Describe the principal forms of fracture of the patella, their symptoms, and, very briefly, the processes for their repair.

6. What are the chief diagnostic symptoms of ovarian tumours, and what cases may be best selected for ovariotomy?

MEDICINE.

1. Enumerate the most common organic diseases of the cardiac valves. Describe the physical signs of a mixed case of obstructive and regurgitant aortic, and of mitral regurgitant disease, and state what would be the effect of such lesions on the heart itself, and on other organs.

2. Define the following stethoscopic terms: bronchial respiration; bronchophony; mucous râle; crepitation; amphoric respiration. In what diseases are humid râles heard in the lungs, and what would be the differential diagnoses of these diseases?

3. Describe a typical case of typhoid fever ending in perforation on the 19th day. What should be the treatment of the perforation, if recognised?

4. What are the symptoms and treatment of chronic ulcer of the stomach leading to perforation?

5. What are the chief causes, and what should be the treatment of convulsions in children under two years old?

6. For what purposes are salts of lead used in Pharmacy? What are the symptoms and treatment of chronic lead poisoning?

NATURAL HISTORY, &c.

Answer five or more of the following Questions.

1. What are the drugs obtained from the Nat. Ord. Leguminosæ, and what are the botanical names and native countries of the plants producing them?

2. Enumerate the Natural Orders, Botanical names, and native countries of the principal Diuretic plants.

3. Of what parts does the seed of a Dicotyledonous plant consist?

4. In what part of the plant is the pollen grain developed? What is its function, and how performed?

5. In what part of the stem does liber occur; what are its characters and economical applications; from what natural orders do our manufacturers derive the greatest supply?

6. What are the chemical and physical properties of Gutta-percha and India-rubber?

7. Describe the principal modifications of the vertebral column in the Class Vertebrata.

8. How can you distinguish microscopically a piece of wood, bone and tooth of mammal, claw and bone of bird, horn of Ruminent, and shell of a lamelli branch?

9. Upon what principles is the Mercurial Barometer constructed?

10. Why does the Barometer tend to rise before or during dry weather, and to fall before or during rain?

11. In what form does iron ore chiefly occur in Britain; and what is the process of extracting the metal?

12. Define tersely the terms Dialysis, Induction, Detonation, Ebullition, Evaporation, Congelation, Allotropic, Oblique, Horizontal, Arithmetical and Geometrical Progression.

PRACTICAL EXAMINATION.

Of Medical and Surgical patients. Operations on the dead body, bandaging, &c.

NETLEY EXAMINATION, AUGUST, 1863.

A. WRITTEN QUESTIONS.

I.—MILITARY SURGERY.

1. What are the series of symptoms which may be expected to occur when a Lung has been penetrated by a Rifle Ball? Mention the chief circumstances which may lead to an error in diagnosis as to such an injury having taken place.

2. Name the various kinds of Defective Vision, independent of those consequent on injury or diseased action, which incapacitate soldiers for the proper use of the rifle. Explain the nature of these defective conditions; show how they are to be distinguished from each other, and state the means of establishing their existence in cases of alleged disability in consequence of them.

3. Describe the Systematic Inspection of a Recruit, and the purpose of each step of the examination.

II.—MILITARY MEDICINE.

1. Name the Endemic Diseases of India which chiefly injure the health or destroy the life of the European soldier, giving their classes and orders according to the official system of classification, and a summary of the] causes supposed to be most active in their production and propagation.

2. What are the chief Diseases of the Circulatory System observed by you among soldiers; to what causes do you attribute them, and how far do you deem such causes remediable?

3. In a case of supposed Acute Hepatitis give the diagnostic value—
a, of pain; *b*, of jaundice; *c*, of cough, increased respiration, &c.; and *d*, of enlargement of the liver.

III.—PATHOLOGY.

1. Define the Nomenclature necessary to be attended to in the description of Venereal Sores.

2. Describe the modes by which elimination of the material in Peyer's Patches occurs in cases of Typhoid Fever.

3. State the main points in the phenomena of Typhoid Fever which distinguish a case of this disease from a case of Typhus.

4. Enumerate the forms of Degeneration which occur in Tissues or Organs, and state how the existence of such degenerations may be recognised.

IV.—HYGIENE.

1. What are the general principles to be attended to in the choice and preparation of sites for barracks?

2. What diseases are supposed to be communicated through the agency of water? How would you examine for organic matter in water?

3. How would you determine the amount and direction of movement of air in a room, and the sufficiency of ventilation?

4. What measures would you adopt if cases of Yellow Fever were to appear in a barrack in the West Indies?

B. PRACTICAL EXAMINATION.

I. AND II.—MILITARY SURGERY AND MEDICINE.

Examination and concise statement of the history, diagnosis, prognosis, effects of treatment and influence of the disease (or injury) on the fitness for further military service, of a case in the Surgical, and one in the Medical, Divisions of the Royal Victoria Hospital.

III.—PATHOLOGY.

1. Mention the lesions shown in the three preparations before you, describe their nature, supposed origin, probable progress, and probable result.

2. Name the parasites contained in the five jars before you.

3. Describe the lesions shown in the preparations on the two trays before you.

4. Determine the magnifying power of the combination of lenses of the two microscopes on the table.

IV.—Hygiene.

1. Chemical examination of various specimens of water.
2. Do. do. do. do. beer.
3. Microscopical do. do. do. adulterated flour.

Combined Results of the Chelsea Examination in February, and of the Netley Examination in August, 1863.

Order of Merit, as finally settled.	Names arranged in the Order of Merit for both Examinations.	Total Number of Marks gained. (Maximum possible, 7,000.)	Order of Merit, as finally settled.	Names arranged in the Order of Merit for both Examinations.	Total Number of Marks gained. (Maximum possible, 7,000.)
1	E. Chandler	4,935	9	W. W. Quinton	3,959
2	W. Creyk	4,737	10	G. W. McNalty	3,924
3	E. Venning	4,500	11	W. T. Martin	3,821
4	A. Brebner	4,458	12	S. N. Davies	3,772
5	W. Nash	4,385	13	W. J. Page	3,653
6	W. E. Dudley	4,233	14	F. Ferguson	3,628
7	A. Doig	4,125	15	R. G. Segrave	3,013
8	H. A. Martin	3,980			

CHELSEA EXAMINATION, AUGUST, 1863.

Anatomy and Physiology.

1. Describe the parts contained in the space bounded above by the lower border of the jaw, below by the os hyoides, behind by a line drawn from the angle of the lower jaw to the extremity of the great cornu of the os hyoides, and internally by the medium line of the neck.

2. Describe the parts concerned in femoral hernia, and the variations to which they are subject.

3. Describe the physiological effects of division or injury of the portio dura above the point where it gives off the chorda tympani nerve.

4. What is the cause of the suffocation which usually supervenes upon division of the inferior laryngeal nerves, or of the trunk of the pneumogastric above those branches? And state which muscles of the larynx are supplied by the superior larygeal nerve.

5. Give an account of what is known respecting the structure and functions of the lymphatic glands.

Surgery.

1. Give some account of the varieties of hydrocele, *i.e.*, of collections of watery fluid connected with the testicle and spermatic cord. Does any similar disease occur in women? If so, what is it?

2. Describe the principal forms of prolapsus ani, *i.e.*, of eversion and protrusion of the lower part of the rectum, and state how you would treat each of them.

3. Describe the ordinary symptoms of dislocation of the head of the humerus downwards and inwards; and state, particularly, the symptoms on which you would chiefly rely for diagnosis in old as well as in recent cases of such dislocation.

4. Describe any three of the modes of treatment for the cure of varicose veins of the leg, and state the merits and demerits of each of them.

5. What are the chief circumstances in which Epistaxis occurs, and the best corresponding means of treatment?

6. Make lists of the instruments, and of the materials for the first dressings, required for the operations of amputation above the knee, tracheotomy, and extraction of cataract.

7. Describe the symptoms of "chronic rheumatic arthritis" affecting the hip-joint, and the changes of structure to which it usually leads.

MEDICINE.

1. Describe a case of pleurisy in the left side leading to great and long-continued effusion. The course of the disease; the symptoms at each stage; the effects and the treatment must all be given.

2. Contrast the physical signs given by the following diseases—a large weak fatty heart; great hypertrophy of the left ventricle without valvular disease; hypertrophy with obstructive and regurgitant disease of the aortic valves.

3. What are the causes of Hæmaturia, and how would you diagnose the source of the blood from the condition of the urine?

4. How would you mange—

(1) A breech presentation?
(2) Profuse flooding immediately after delivery?
(3) Retained placenta?

5. What are the most usual views now held of the nature and consequences of Thrombosis and Embolism?

6. Enumerate the chief pharmaceutical preparations derived from cinchona bark. Mention the several diseases or conditions in which quinine is found useful, and state what are the best substitutes for it.

NATURAL HISTORY, &c.

Answer any five or more of the following Questions.

1. To what Natural Orders do the Mints, Rue, Sabadilla, and Squill belong? Give the botanical names and native countries of these plants.

2. Illustrate the phenomena of transpiration, respiration, and absorption in plants.

3. What are the botanical and officinal characters of the Natural Orders Solanaceæ, Umbelliferæ, and Cruciferæ?

4. Enumerate the vegetable anthelmintics.

5. What are the properties and characters of Starch and Gluten?

6. To what Class and Order of Animals does the Leech belong? Describe its mouth and digestive system.

7. Enumerate the Orders of the Classes Aves and Insecta, and give their characters.

8. Define and illustrate the phenomena of latent heat and specific heat.

9. Why do the density and temperature of the atmosphere diminish in ascending mountains?

10. Construct a galvanic pile, and give the rationale of its action.

11. What are the noxious gases which prevail in badly-ventilated localities?

12. Define the terms catalysis, dialysis, fermentation. amalgamation, hybernation, endosmose, crystallisation, idiosyncracy, psychology, ontology.

Practical Examination as before stated.

NETLEY EXAMINATION, FEBRUARY, 1864.

A. WRITTEN QUESTIONS.

I.—HYGIENE.

1. What are the special circumstances in the life of the soldier at home which are unfavourable to health? Enumerate the chief diseases causing admission into hospital, and mortality. How would you prevent the development of these diseases?

2. What are the effects of the inhalation of sewer air? State the various

means of removing sewage from dwellings. What are the principal disinfectants of air and sewage?

3. What are the general principles of clothing? Describe the accoutrements of the infantry soldier of the line, and discuss their effects on health.

II.—MILITARY MEDICINE.

1. Phthisis pulmonalis being a fatal disease in the army, you are required to give (*a*) its place in the official classification of diseases; (*b*) the causes which appear to operate in its production and propagation in the army; (*c*) the most judicious means of counteracting them; and (*d*) the symptoms, constitutional and physical, of the first stage, assigning to each its diagnostic value.

2. Define Leukœmia, and give (*a*) the causes which appear to induce this condition; (*b*) its diagnosis; and (*c*) the most rational treatment.

3. Give an accurate definition of dysentery. Describe the symptoms and treatment (*a*) of the sthenic, and (*b*) of the scorbutic types of this disease.

III.—MILITARY SURGERY.

1. Enumerate the several varieties of wounds of the head which may be caused by musket bullets, specifying the chief features which distinguish them from each other, and the influence of these features on your prognosis. Sketch, generally, the treatment to be adopted in each variety, and particularly mention what circumstances in any case would induce you to resort to the operation of trephining.

2. Give a description of the nature and consequences of endostitic inflammation, or osteo-myelitis, as observed after gun-shot injuries of bones of the extremities, or after amputations consequent upon them, the treatment you would adopt, and the reasons for your practice.

3. A soldier is reported by the Instructor of Musketry to be incompetent for rifle practice on account of defective vision, the nature of the defect being unknown. You are required to state whether the man's vision is defective or not, and if it be so, to name what defect it is. On examination the man is proved to be neither myopic, hypermetropic, nor presbyopic, but is found to be amblyopic. Describe the course of optical examination by which the diagnosis in this case is arrived at, explaining what sources of fallacy may be met with in the successive steps of the examination, and by what means you guard against them.

IV.—PATHOLOGY.

1. Name and define, as concisely as possible, each of the several forms of continued fever which can be clinically recognized; and describe the anatomical signs which are peculiar and characteristic of typhoid and typhus fever on examination of the body after death from these diseases.

2. Mention the usual temperature of the body at completely sheltered parts of the surface (say axilla), and give a concise account of the value or significance attached to continuous thermometric observations in cases of acute diseases.

3. Mention the circumstances under which you would expect cases of (so-called) pyœmia or phlebitis to occur; explain the nature of such cases, and their *post-mortem* appearances.

B. PRACTICAL EXAMINATION.

I.—HYGIENE.

1. Examination of water; its physical character; determination of amount of chloride of sodium and organic matter contained in it.

2. Examination of water; temporary and permanent hardness; amount of lime.

3. Microscopic examination of adulterated flour.

1. Examination of adulterated beer.
2. Examination of adulterated milk.
3. Microscopic examination of adulterated coffee.

II.—Pathology.

1. Examination of fluid containing parasitic remains.
2. Examination of morbid tissues.
3. Description of morbid specimens from the Pathological Museum.
4. Give the names of the parasites on the table.
5. Determination of the powers of senses.

Combined Results of the Chelsea Examination in August, 1863, and of the Netley Examination in February, 1864.

Order of Merit, as finally settled.	Names arranged in the Order of Merit for both Examinations.	Total Number of Marks gained. (Maximum possible, 7,000.)	Order of Merit, as finally settled.	Names arranged in the Order of Merit for both Examinations.	Total Number of Marks gained. (Maximum possible, 7,000.)
1	A. W. Troup	5,210	18	J. R. Greenhill ..	3,572
2	W. R. Kynsey ..	5,100	19	H. R. Greene	3,511
3	R. W. Lawless ..	4,946	20	R. H. Bolton	3,315
4	J. T. Beattie	4,572	21	H. Morris	3,289
5	R. Cunynghame..	4,492	22	P. P. Lyons	3,259
6	A. Thomson	4,192	23	E. H. Condon....	3,251
7	A. Turner	4,015	24	Jas. Barker......	3,224
8	A. F. Preston....	3,926	25	J. Barry	3,100
9	R. W. Forsayeth .	3,776	26	C. J. Atkins	3,092
10	J. P. Delmege....	3,756	27	W. P. Smith	3,052
11	C. M. D. Cuffe ..	3,743	28	G. Fearon	3,032
12	V. Gouldsbury ..	3,729	29	C. J. Weir	3,029
13	J. A. Shaw	3,710	30	F. Howard	2,989
14	C. Haines	3,707	31	T. A. Byrne	2,983
15	F. Dick	3,698	32	W. Elgee	2,784
16	H. C. Collier	3,622	33	T. White........	2,573
17	J. E. Barker	3,619			

CHELSEA EXAMINATION.—February 1864.

Anatomy and Physiology,

1. Describe the parts brought into view when the trapezius muscle is removed.

2. Describe the shoulder joint, noticing in the order in which they occur in dissection, the muscles, nerves, and vessels, and other parts in immediate relation with it.

3. Describe the duodenum, the structure of its various coats; its vessels, nerves; relations to other parts, and its physiological function.

4. Describe the arch of the aorta, its relations, the branches rising from it, and the more usual deviations from the normal disposition to which they are subject.

5. Give an account of the mode of development of the kidney, from the earliest period; do the same also with respect to the testis.

Surgery.

1. Describe the usual symptoms of Necrosis of the last phalanx of a thumb or finger; and the treatment you would adopt in its several stages.

2. Describe minutely the process of granulation, and the formation of a scar, in the healing of a wound by the second intention.

3. Describe the ordinary characters of a femoral hernia of moderate size,—say an inch in diameter,—and the characters by which you would distinguish such an one, if irreducible but not strangulated, from other swellings that may occur in the same position.

4. Describe the principal forms of fracture of the patella, and the several appropriate modes of treatment. stating particularly the treatment you would employ as the best for obtaining a close union of the fragments.

5. Describe the purulent ophthalmia of infants (ophthalmia neonaterum), the morbid conditions of the eye to which it may lead, and the treatment usually advisable.

6. Write prescriptions, either in Latin or English, for the following medicines for hospital use: Zinc Lotion, Black Wash, Black Draught, Compound Chalk Mixture, Colocynth and Calomel Pills, Jalap and Calomel Pills.

Medicine.

1. Enumerate the principal causes of Delirium, and describe fully the symptoms of Delirium Tremens, contrasting it with delirium from other causes. Give the treatment of Delirium Tremens.

2. Describe a case of acute Asthenic Pneumonia in a young adult, and give both general symptoms and physical signs. Compare such a case with pneumonia connected with pyæmia. Describe the appearances after death in both forms.

3. What are the chief causes of displacement of the heart. How can they be recognised ?

4. Describe the following diseases of the skin: scabies, acne, and erythema nodosum.

5. What are the chief emetics ? Give their doses, and mention some of the indications for their use.

6. What are the symptoms and treatment of pelvic abscess after parturition ?

Natural History, &c.

Answer any five or more of the following questions.

1. Give the distinctive characters of the Animal and Vegetable Kingdoms.

2. Enumerate the classes and principal sub-divisions of flowering plants, and state upon what characters they are founded.

3. What are meant by proximate principles in plants and animals ? Give examples, and state their chemical composition.

4. Of what organs does a grain of wheat consist; and of what a grain of unhusked oats and unhusked barley ?

5. Describe the germination of a grass-seed and of a bean-seed.

6. From what parts of what British plants are Diuretics and Emetics obtained ?

7. Enumerate those British plants which give rise to the most frequent cases of accidental poisoning. Give their natural orders and their most obvious characters.

8. From what plants may cane sugar and grape-sugar be derived ? and how do these substances differ in properties and in chemical characters ?

9. Describe the electrifying machine; and give the rationale of its construction and action.

10. Mention some substances which radiate heat badly and conduct it well; and some which conduct heat badly and radiate it well.

an 11. In what organs or tissues of plants and animals does phosphoric acid chiefly occur and in what combinations ?

12. Describe the respiratory system in Fish, Reptiles, Mollusca, and Articulata.

13. How do calc-spar, marble, chalk, and quick-lime differ, chemically, and in their external properties ?

14. What are the most important deodorising substances, and how are they obtained ?

15. Explain and give the derivations of the terms Autopsy, Analysis, Diagnosis, Polarisation, Dialysis, Detonation, Crepitation, Viscosity, Tenacity, Elasticity.

Practical Examination as before stated.

(SECOND) CHELSEA EXAMINATION.—MARCH, 1864.*

ANATOMY AND PHYSIOLOGY.

1. Enumerate the parts which form the boundaries of the thorax; and give a general description of the ribs, noticing the peculiarities by which certain ribs are distinguished.

2. The Gastroenemius and Soleus having been removed, mention the parts thus brought into view from the upper border of the *popliteus* muscle to the heel, and notice particularly the relative position of the tendons, vessels, and nerves passing behind the ankle joint.

3. Describe the structure and relations of the membranous portion of the urethra.

4. Enumerate the various muscles, and describe their respective actions, by which the deformity witnessed in the following fractures is probably caused:—

1. Fracture of the neck of the femur.
2. Fracture of the lower end of the femur immediately above the condyles.
3. Fracture of the lower end of the radius (Colles' Fracture).

5. Mention the principal head under which alimentary substances may be arranged, and give one or more instances of substances belonging to each group.

SURGERY.

1. By what signs are hydrocele of the tunica vaginalis, varicocele of the spermatic veins, and irreducible scrotal hernia, severally distinguished?

2. Describe the processes by which hemorrhage from a completely divided artery may be naturally arrested; and those which follow the tying of an artery so divided.

3. State the general plan of treatment to be advised in the case of a recently incised wound of a knee-joint; describe the signs indicating an acute inflammation of the joint after such a wound, and the appropriate treatment.

4. Describe the usual characters, including the internal structure, of external and internal hemorrhoids, and the treatment usually proper for external hemorrhoids when they are acutely inflamed.

5. Describe a well marked case of gonorrhœal ophthalmia, and the morbid changes to which, in its unchecked progress, it may give rise.

6. Describe the principal changes, both functional and structural, in the bladder and kidneys, which may be caused by long-continued stricture of the urethra.

MEDICINE.

1. Describe the symptoms and causes of acute laryngitis, and of chronic ulceration of the larynx. What is the treatment of laryngeal ulceration?

2. What are the chief causes which produce absence of vesicular murmur in one lung? Define precisely what you mean by bronchial respiration, and state in what morbid conditions it is heard.

3. What is the treatment of the following diseases: ulceration of the stomach before and after perforation; simple thickening of the pylorus, and acute gastritis from irritant poisoning?

4. What are the causes, symptoms, and treatment of ascites?

5. What are the symptoms of simple and of extra-uterine pregnancy?

6. What are the uses of belladonna? What are the symptoms of poisoning by this drug, and the treatment?

NATURAL HISTORY, &c.

Answer five or more of the following questions.

1. From what countries is Opium imported; how are the different kinds distinguished: and in what respects do their properties differ?

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* An additional number of candidates being required, a second examination was held at Chelsea during the spring of 1864, the limit of age being extended to thirty years.

2. What are the principal Alkaline contents of Sea-water?

3. What is meant by Nitrogenous principles in Food? Give examples of Nitrogenous and non-Nitrogenous Foods.

4. In what parts of the Animal System does Phosphorus exist, and in what states of chemical combination?

5. What are the principal modifications of cell-structure in the Animal and Vegetable kingdoms? Give some examples of morbid cell-development in the Animal System.

6. Enumerate the antiperiodic Febrifuges, mineral and vegetable. Give their sources, principal preparations, and doses.

7. What are the chief symptoms of poisoning by poisonous Mushrooms, Aconite, Henbane, and Stramonium respectively; and what is the general treatment to be pursued?

8. Describe a Voltaic pile, and give the rationale of its action.

9. What are the sensible properties of Ice and Vapour, including Steam, respectively; and what phenomena of heat accompany their conversion into water?

10. Describe botanically the following fruits: Apple, Strawberry, Mulberry, Acorn, Plum.

11. Of what part does a Dicotyledonous seed usually consist?

12. What are Ruminantia? Give examples, and describe the digestive system of the Order.

13. Describe the general structure of the Class Crustacea.

14. Define the following terms: Organ, Function, Hydrate, Carbonate, Allotropic, Sthenic, Endosmose, Fermentation.

Practical Examination, as before stated.

NETLEY EXAMINATION.—August, 1864.

A. Written Questions.

1.—Military Surgery.

1. Mention the several purposes for which the convex and concave spectacles are supplied in the Regimental Optical and Ophthalmoscopic Case of Instruments, and describe the method of using them, in conjunction with the Test Types, for distinguishing Emmetropia, Myopia, Hypermetropia, whether simple, or complicated with Presbyopia or Amblyopia. Explain the theory on which the diagnosis in each instance is established.

2. Describe the nature, effects, and proper treatment of Osteo-Myelitis, after Gunshot injuries of Long Bones, or of Amputations consequent upon them.

3. Describe accurately, step by step, the operations of excising the shoulder and elbow joints, each by a single linear excision, as practised in the Post-Mortem Room.

2.—Military Medicine.

1. From what date may cholera be said to have engrafted itself on the endemics of the soil of India? What are the conditions which appear to act most powerfully as predisposing causes of the disease? What influence do high or low situations respectively exert—

(*a*) on the proportionate mortality of those attacked?

(*b*) on the proportionate number of those seized?

Explain in what way excessively long marches appear to increase the virulence of an epidemic of this disease in soldiers, Native or European, in India. Give an accurate description of the premonitory and actual symptoms—

(*a*) in the slight,

(*b*) in the severe forms of the disease;

and describe the effects of its presence on the blood and secretions. What are the chief points to keep in view in our endeavour to exclude this disease from garrisons, camps, and cantonments, and to mitigate the severity of an epidemic when it appears? Give a description of the most rational treatment—

(*a*) in the premonitory,
(*b*) in the confirmed,
(*c*) in the state of febrile reaction,

particularly stating in what stage and to what extent opium is useful and safe.

2. What is the average weight of the Liver in health, in a man between the ages of 18 and 40? Describe accurately its normal position and limits. Explain the most common causes of abnormal position of the gland. Give the precautions necessary to accuracy in the use of percussion and palpation in investigating hepatic diseases.

3. Give as complete an account as you can of the therapeutic uses and value of Ipecacuanha in tropical medicine.

3.—MILITARY HYGIENE.

1. What are the chief causes and effects of impurity of air in the habitations of men?

2. How would you determine the amount of carbonic acid, watery vapour, and suspended matters in the air?

3. Enumerate the principal adulterations of Wheat Flour, and state how you would determine—

(*a*) the quality of the flour;
(*b*) the presence of pea flour, oats, and maize.

4. What has been the Medical History of the West Indies as far as Europeans are concerned? State explicitly what you would do in a West Indian Station, if there occurred—

(*a*) a considerable yearly number of diarrhœal and dysenteric cases;
(*b*) a considerable number of admissions from typhoid fever;
(*c*) a number of admissions from paroxysmal fever;
(*d*) occasional outbreaks of yellow fever.

4.—PATHOLOGY.

1. Give a classified account of the lesions in the kidney which were demonstrated during the past session in the practical room.

2. Describe the nature and probable origin of the parasitic cyst in the liver, which proved fatal in the case of Private * * * * as shown at the Post-Mortem Examination on June 28th, 1864.

3. Mention the period of incubation, and describe the course and progress of an infecting venereal sore, and contrast your account with similar details relative to venereal sores which do not infect the system.

B. PRACTICAL EXAMINATION.

1.—MILITARY SURGERY, and

2.—MILITARY MEDICINE.

Make an examination of the case of . Write concisely a history of the case, your diagnosis, prognosis, the probable effects of treatment, and the influence of the disease, or injury, on the man's fitness for service as a soldier.

(Twenty minutes allowed for the examination; half-an-hour for the description.)

3.—HYGIENE.

Examination of two specimens of Water;
Examination of adulterated Milk and adulterated Beer;
Microscopic examination of adulterated Wheat Flour.

4.—PATHOLOGY.

Description of various Preparations and Microscopic Specimens, and Examination of Secretions.

COMBINED RESULTS of the Chelsea Examination in February, and of the Netley Examination in August, 1864.

Order of Merit as finally settled.	Names arranged in the Order of Merit for both Examinations.	Total Number of Marks gained. (Maximum possible, 7,000.)	Order of Merit, as finally settled.	Names arranged in the Order of Merit for both Examinations.	Total Number of Marks gained. (Maximum possible, 7,000.)
1	J. Wallace	5,064	21	J. D. Ambrose	3,479
2	W. Jobson	4,755	22	Jas. Atkinson	3,435
3	J. W. Fleming	4,584	23	J. Anderson	3,402
4	W. Atkinson	4,547	24	F. Johnson	3,335
5	H. H. E. Phillips.	4,486	25	A. Minty	3,306
6	T. W. Orwin	4,447	26	G. Atkinson	3,292
7	R. Hickson	4,157	27	J. Burke	3,257
8	J. G. Bolster	4,121	28	J. A. T. Malcolm.	3,226
9	H. T. L. Melladew	3,981		J. Gray	3,226
10	J. Middleton	3,956	30	T. M. Kirkwood.	3,157
11	B. J. Finegan	3,880	31	A. N. Watts	3,119
12	D. A. Leslie	3,789	32	R. W. Davies	3,091
13	H. S. Muir	3,765	33	G. F. Dooley	3,073
14	J. W. Maxham	3,642	34	G. F. Dunlop	3,036
15	R. Hyde	3,628	35	J. N. Stock	3,035
16	T. G. Barrow	3,611	36	J. Ball	3,030
17	M. Cogan	3,594	37	J. G. King	2,975
18	R. Turner	3,578	38	A. W. S. Lithgow.	2,964
19	C. F. Churchill	3,493	39	D. P. Ross	2,960
20	T. Rabington	3,486			

It is gratifying to be able to speak favourably of the general good conduct, diligence, and attainments of the Candidates who attended the three sessions above referred to.

THE CRIMEAN MONUMENT AT NETLEY.

On the 1st of August, 1864, His Royal Highness the Prince of Wales laid at Netley the foundation-stone of a monument to the memory of the Officers of the Army Medical Department who died while serving with the Army of the East, during the Crimean War. The monument, which was designed by, and erected under the superintendence of T. Hayter Lewis, Esq., Professor of Architecture in University College, is about sixty feet high, and has the general character of a monumental cross of the early part of the 13th century. The main portion of it is built of Portland stone, but the columns and small shafts are of Derbyshire marble. The inscriptions and much of the ornamental work are incised in slabs of fine stone, and filled in with hard black cement.

The monument stands on a solid octagonal pedestal, above which is a canopied arcade of eight arches, under the protections of which are the inscriptions. Above this arcade the monument rises up by two stages to an ornamental cross at the summit.

The upper of the two stages has four canopied arches, containing allegorical figures of England, Scotland, Wales, and Ireland.

The whole of the works were executed by Messrs. Myers and Sons.

The names of the officers to whose memory the monument has been erected, are recorded on seven of the panels, and on the eighth is the following inscription :—" In memory of the Officers of the Army Medical Department, who died whilst serving with the Army in the East, during the War with Russia, in 1854, 1855, and 1856. This Monument has been erected by their Brother Officers and Friends."

The ground for the site was kindly granted by Lord De Grey, the Secretary of State for War, and prepared for the foundations under the superintendence of Major Ravenhill, R.E. The monument has now been completed, and the total expenses incurred have amounted to 892*l.*

The following are the names inscribed on the monument :—

Deputy Inspectors-General.

T. Spence, M.D.
A. McGrigor, M.D.

Staff Surgeons, First Class.

J. Mitchell, M.D.
G. K. Pitcairn, M.D.
J. Marshall.
Chilley Pine.
N. O'Connor, M.D.

Surgeons.

F. C. Huthwaite, Grenadier Guards.
E. Le Blanc, 9th Regiment.
W. Simpson, M.D., 17th Regiment.
W. A. Anderson, 41st Regiment.
C. Macartney, M.B., 77th Regiment.
F. Smith. 95th Regiment.
W. Browne, 95th Regiment.
D. Anderson, M.D., Staff.
P. Mackey, M.D., Staff.
J. Newton, Staff.
J. A. Wishart, M.D., Staff.
M. A. Jane, Staff.
C. B. Bassano. Staff.

Assistant Surgeons.

M. C. Ancell, 11th Hussars.
J. P. Langham, 7th Regiment.
E. S. Wason, 13th Regiment.
W. Renwick, 14th Regiment.
E. A. Jenkin. 23rd Regiment.
J. Lamont, M.D., 41st Regiment.
J. Thomson, M.D., 44th Regiment.
H. Beckwith, 49th Regiment.
P. G. Martel, 50th Regiment.
J. J. Norris, 55th Regiment.
J. F. O'Leary, 68th Regiment.
J. Grabham, 71st Regiment.
J. H. Gilborne, 71st Regiment.
F. Y. Shegog, M.D. 88th Regiment.
J. A. Shorrock, Rifle Brigade.
A. R. Reid, M.D., Staff.
E. P. Boyle, Staff.
F. A. Macartney, Staff.

Acting Assistant Surgeons.

H. Ludlow.
A. Struthers, M.D.
R. T. Simons.
J. H. White.
F. Graham.
T. O. Mitchell.
J. Mayne.
H. W. Wood.
J. Longmore.

Principal Apothecary.

G. H. Reade.

Dispensers of Medicines.

J. M. Beveridge.
J. H. Whitwell.

Hospital Dressers.

H. Harrison.
T. Fell.

Civil Surgeons.

R. J. McKenzie, M.D., F.R.C.S. Ed.
E. J. Complin, M.R.C.S. Eng.

Civil Dispenser.

J. H. Edmonds.

CIRCULARS, GENERAL ORDERS, MEMORANDA, &c.,

HAVING REFERENCE TO THE OFFICERS OF THE ARMY MEDICAL DEPARTMENT, ISSUED DURING 1864.

Army Medical Department, 2nd January, 1864.

Re-engagement of soldiers.

Sir,—It having been represented to His Royal Highness the Field Marshal Commanding-in-Chief that medical officers in charge of regiments and battalions are in the habit of rejecting men who offer to re-engage on slight and insufficient grounds; and His Royal Highness having decided that no soldier should be refused permission to re-engage on account of minor disabilities or defects which do not interfere with the efficient performance of his duties, or entail a probability of doing so at no distant date, I have the honour to forward a copy of a certificate which it has been deemed advisable to substitute for that promulgated in Circular Memo. General, No. 298, dated Horse Guards, 19th May, 1864; and to request that you will impress upon medical officers serving under your supervision, the necessity of guarding against undue strictness in dealing with men who have already completed their first period of enlistment, and who have not only some claim upon the service, but are, as disciplined soldiers in the prime of life, exceedingly valuable to the country.

Men considered unfit for re-engagement by the surgeon in charge of their corps, should be brought before a medical board, which should determine the question of fitness on the same general grounds as are now applicable to men brought forward for discharge on account of disabilities.

I have, &c.,
J. B. GIBSON, Director General.

Certificate for re-engagement.

I certify that I have carefully examined * * * of the * * Regiment, who wishes to re-engage for a further term of years, and that, in my opinion, he does not suffer from any disability or ailment likely to interfere with the efficient performance of his duties, either at home or abroad.

Circular No. 848. (Hospital Shoes, &c.)
7581/664 Home and Foreign (exclusive of India).

War Office, 23rd January, 1864.

Hospital shoes.

The Secretary of State for War having, with the concurrence of His Royal Highness the Field Marshal Commanding-in-Chief, decided that in future convalescents in hospital shall, when taking out-door exercise, wear their own boots, instead of using the hospital shoes or slippers, the same is notified for the information and guidance of Commanding Officers, Medical Officers, Purveyors, and others.

The men's boots in such cases will be issued by the Purveyor from the Pack Store, and may be kept in the possession of the patients until their discharge from hospital.

EDWARD LUGARD.

To Officers Commanding,
Medical Officers, Purveyors, and others.

INSTRUCTIONS for the Examination of Orderlies of the Medical Branch of the Army Hospital Corps.

Examination of orderlies.

Orderlies who are recommended for promotion to the rank of *2nd Class Sergeant*, or *Assistant Wardmaster* in the Medical Branch of the Army Hospital Corps, should be examined on the following subjects by a medical officer appointed to perform that duty by the Principal Medical Officer of the District in which the orderly may be serving at the time, and a *verbatim report* of the examination, certified by the examining officer, should accompany the recommendation for promotion:—

1. Each orderly offering himself for examination should be required to write

from dictation at least twenty lines on a sheet of foolscap;—(a professional subject should be selected for this).

2. To answer at least three questions on each of the following subjects:—

Addition.
Subtraction.
Multiplication.
Division.
Fractions { Vulgar.
Decimal.

[The calculation of hospital diets for any given number of patients, and the mode of ascertaining the averages of sick under any given circumstance, might be used for this purpose, and the questions should be sufficiently comprehensive to test his knowledge of these elementary rules of arithmetic.]

3. He should be examined as to his knowledge of—

The human body, including the names, position, &c., of the principal arteries, and the mode of arresting hœmorrhage.

The mode of carrying wounded men off the field, especially with reference to the nature and position of wounds or injuries from which the men may be suffering.

The application of fomentations, poultices, mustard plasters, blisters, leeches, injections, liniments, &c.

The mode of making and applying bandages, minor dressings, trusses, and of lining splints.

The management of helpless patients with reference to moving, changing, cleanliness, feeding, and administration of medicines.

The names, uses, and appearances of the various surgical instruments and appliances in general use.

The mode of resuscitating a person rescued from drowning.

The best mode of cleaning windows, ward floors, hospital furniture, and utensils.

The use and mode of observing and noting the range of the meteorological instruments, but more particularly the thermometer as used for testing the temperature of baths, wards, &c.

The method of regulating the ventilation of wards, and the object of such ventilation.

The observation of the sick as regards the appetite, intelligence, breathing, sleep, secretions, expectoration, pulse, skin, state of wounds, eruptions, &c., with a view of testing his ability to give an intelligible account of the patient's medical history between the visits of the medical officer.

The use of ambulances, and of medical field equipments for regiments, when practicable.

4. His knowledge of *cooking* and of preparing the various forms of drink commonly used in *military hospitals* should be ascertained and reported upon.

5. Every recommendation for the promotion of a private of the Medical Branch of the Army Hospital Corps should be accompanied by an abstract of his defaulter sheet, medical history sheet, and record of service, and the officer recommending should state explicitly his reasons for considering the applicant fit for promotion.

6. At General Hospitals' examinations of men of the Medical Branch who consider themselves qualified for promotion, should be held periodically at the discretion of the Principal Medical Officer, and should be competitive.

J. B. Gibson, Director General.

Army Medical Department,
31st January, 1864.

Medical.

Army Medical Department, 18th February, 1864.

Extra orderlies to be included in W. O. Form 1018.

Sir,—I have the honour to request you will have the goodness to direct all medical officers in the * * * Division who are in charge of hospitals to which men of the Army Hospital Corps (Medical Branch) are attached, to enter in future on the 3rd page of their return after such men the names of any extra orderlies from the ranks who may have been employed during the period (as pointed out in the enclosed form), stating the circumstances which rendered the additional aid necessary, but not including them in the numerical portion of the return on the 1st and 4th pages.

I have, &c.,
J. B. Gibson, Director-General.

The Principal Medical Officer, &c., &c., &c.

Instructions for the Guidance of Medical Officers in the Selection, Training, and Appointment of Hospital Servants.

Selection, appointment, and training of hospital servants.

1. Hospital serjeants and orderlies should be selected by the commanding officer and surgeon conjointly, from soldiers of at least one year's service in the ranks.

2. Hospital serjeants and orderlies shall on no account be employed on any but hospital duty ; nor shall they be removed except in cases of misconduct or inefficiency, when they shall be liable to be ordered forthwith to their duties in the ranks, and a fresh selection made by the commanding officer and surgeon conjointly.

3. Every hospital orderly should be able to read and write.

4. As soon as the establishment of general hospitals under the new regulations is completed, every hospital attendant should be sent to a general hospital for a course of instruction and training in hospital duties, so as to ensure a uniformity of system throughout the service ; and this instruction should take place under the superintendence of a medical officer specially appointed by the principal medical officer of the hospital for that purpose, and for such period and in such manner as the director-general may from time to time determine.

5. Nevertheless, regimental surgeons should be held strictly responsible for the instruction and training of the serjeants and orderlies in their hospital duties, irrespective of any training they may receive in a general hospital; and all hospital attendants in the medical branch should undergo a course of training in the following subjects :—

A general knowledge of the human body, including the names, position, &c., of the principal arteries, and the mode of arresting hemorrhage from them.

The modes of carrying wounded off the field, especially with reference to the nature and position of the wound.

The application of fomentations, poultices, mustard-plasters, blisters, leeches, injections, liniments, &c.

Making and applying bandages, minor dressings, trusses, and lining splints.

Management of helpless patients, with reference to moving, changing, cleanliness, feeding, and administration of medicines.

The names, uses, and appearances of the surgical instruments and appliances in general use.

The mode of resuscitating a person rescued from drowning.

The modes of polishing ward floors.

The use of the thermometer.

Ventilation of wards.

Observation of the sick as regards :—

Secretions,
Expectoration,
Pulse,
Skin,
Appetite,
Intelligence,
Breathing,
Sleep,
State of wounds,
Eruptions.

The use of ambulances (when practicable), and of the medical field equipments which may be issued to regiments.

6. Every hospital orderly should be instructed in turn in the cooking of diets for the sick, preparing drinks, &c., by the hospital corps cook attached to the hospital.

7. Inspectors and Deputy Inspectors-General, at their periodical visits, should satisfy themselves that this course of training has been carried out.

8. The regimental hospital serjeant should perform the duties laid down for assistant wardmasters in the new medical regulations.

9. The first year's service of the hospital serjeant should be considered probationary; and if he has not qualified himself as compounder of medicines in accordance with the medical regulations, and made himself master of his other hospital duties within that period, he should return to his duty in the ranks.

J. B. Gibson, Director-General.

Army Medical Department, 1st March, 1864.

E. H.

Circular Memorandum.

(Addressed to Infantry Regiments at Home, Abroad, and Recruiting Districts.)

Horse Guards, S.W., 4th March, 1864.

General No. 285.

Recruiting.
1—1864.

Reduction of Infantry standard.

His Royal Highness the Field-Marshal Commanding-in-Chief, with the concurrence of the Secretary of State for War, approves of the standard for infantry recruits being reduced from 5 feet 6 to 5 feet 5 inches until further orders.

Chest measurement for such recruits to be not less than 33 inches, except those for rifle corps, who are not to be taken under 34 inches.

By command,
James Yorke Scarlett, Adjutant-General.

Circular No. 854. (Army Hospital Corps Regulations.)

20
Army Hospital Corps.
[illegible] 484

Home and Foreign (exclusive of India).

War Office, 7th March, 1864.

Army Hospital Corps Regulations.

The annexed regulations applicable to the Army Hospital Corps have been approved by His Royal Highness the Field-Marshal Commanding-in-Chief and the Secretary of State for War, and are promulgated for the information and guidance of officers and others concerned.

Edward Lugard.

To Officers Commanding, Medical Officers,
Purveyors, &c.

Regulations on Points of Discipline, &c., for the Army Hospital Corps.

1. When a soldier is desirous of entering the Army Hospital Corps, the annexed form of return (A) is to be filled up by his Commanding Officer and forwarded to the officer commanding the corps. Should there be any objection to the candidate, the officer commanding will state the same in forwarding the return for the approval of the Director-General of the Army Medical Department, or the Purveyor-in-Chief, by whom, if approved, the name will be submitted to the Adjutant-General for the consideration of the Field-Marshal Commanding-in-Chief.

2. All promotions to the rank of non-commissioned officer are in the first instance to be recommended to the officer commanding the corps; by the governor, should the man be serving in a general hospital; otherwise by the principal medical officer or the purveyor at the station where he is serving, according to the branch of the corps to which he belongs. The recommendation, accompanied by any remarks he may have to offer, will be forwarded by the commanding officer to the Director-General or Purveyor-in-Chief, as the case may be, by whom, if approved, it will be submitted for the consideration of the Field-Marshal Commanding-in-Chief. At foreign stations, commanding officers may, on the recommendation of the Purveyor, promote deserving men to the rank of lance serjeant or first-class private, to fill vacancies in the establishment allowed for the Purveyor's department, such rank to be held only so long as the men perform the higher duties, and otherwise conduct themselves to the Purveyor's satisfaction. But at home all such promotions will be made by the Purveyor-in-Chief.

The allowances of 1*s.* a day to compounders, and of 2*d.* a day to privates employed as barbers, are not to be paid until sanctioned by the Secretary of State for War.

3. The records of service of the entire corps are to be kept by the officer commanding the corps at Netley, and the attestations by the principal Purveyor at that station: who will act as Paymaster to the head-quarters.

4. The Corps Defaulter-book, corresponding with the Regimental Defaulter-book of regiments, to be kept by the officer commanding the corps.

5. Defaulter-sheets, corresponding with the Regimental and Company Defaulter-sheets of regiments, are to be kept in general hospitals by the Captain of Orderlies: at all other stations they will be kept by the officer commanding the regiment or depôt to which the men are attached for discipline.

6. Monthly casualty returns (Form B), containing every variation of the soldier's service, are to be prepared by the Captain of Orderlies in general hospitals, otherwise by the Purveyor of the station, and forwarded to the commanding officer of the corps for entry in the records, and for the information of the Paymaster at head-quarters, who will make corresponding entries on the third page of the attestation. The information required to make up this return will be furnished by the officer commanding the corps to which the men are attached for discipline.

7. Applications from non-commissioned officers and men for leave to marry are to be made to the officer commanding the corps through the governor, if serving in a general hospital, otherwise through the principal medical officer or purveyor of the station, according to the branch to which the applicants belong. These applications must be invariably accompanied by testimonials as to the respectability of the persons whom the soldiers are desirous to marry. Certified copies of the marriage certificates of all men married, either with or without leave, should be sent to head-quarters for entry in the Register of the Corps, as also the baptismal certificates of all children of men belonging to the corps.

A Court-martial Book is to be kept by the officer commanding the corps, who is to be furnished with certified extracts of the proceedings of general, district, or garrison courts-martial held on men of the corps at the several stations, and with the orginals of regimental or detachment courts-martial. These documents will be obtained by the Purveyor or Captain of Orderlies from the officer charged with the discipline of the men, and by him will be transmitted to the head-quarters at Netley. In cases involving the loss of public stores a duplicate extract should be sent to the Purveyor-in-Chief.

9. Whenever circumstances will permit, the non-commissioned officers and men of the medical branch serving both at head-quarters and at detached home and foreign stations will be instructed, under the superintendence of a medical officer, in hospital and ambulance duties.

10. Inspections of regimental necessaries are to be made monthly by the Purveyor, or Captain of Orderlies, as the case may be, who will settle with the men, and complete their Pocket-ledgers at the end of each month. These officers will respectively be charged with the reponsibility of keeping the men's necessaries complete, by supplies to be procured from the Quartermaster's store, on application to the officer commanding the regiment or depôt to which they are attached for discipline, excepting such articles as are only worn by the Army Hospital Corps, which, on application to the officer commanding the corps, by the Purveyor or Captain of Orderlies, will be sent annually with the clothing. When this duty is performed by a Captain of Orderlies, he will furnish the Purveyor with a list and cost of the articles to be charged against each man. With reference to men who become non-effective, Purveyors and Captains of Orderlies will be guided by the clothing regulations in force at the time, relative to the disposal of their clothing. Spare arms will be retained at out-stations, unless otherwise ordered by the officer commanding the corps. The officer commanding will report quarterly to the War Office the numbers and cost of the articles issued during the period from his store of necessaries peculiar to the Army Hospital Corps, in the following form:—

"I have to report that of the articles supplied on my requisition to the War Office dated (*date to be given*), I have forwarded during the past quarter to the undermentioned stations necessaries amounting in value to the sum of (*amount to be specified*), as per detailed statement herewith, with a request to the officer of the purveying department in charge at each station to recover the cost from the men and credit the same to the public in his accounts."

11. Non-commissioned officers and men ordered for service abroad are, in all practicable cases, to be assembled at head-quarters from out-stations prior to embarkation, for the personal inspection of the officer commanding the corps, who will satisfy himself that all such non-commissioned officers and men are complete in every particular relating to records, accounts, clothing, necessaries, and equipment.

12. When the exigencies of the service render it necessary to embark men proceeding abroad from the station where they may be serving without their appearing at head-quarters, the Purveyor or Captain of Orderlies, as the case may be, will certify to the officer commanding the corps that each man is complete in regimental necessaries, clothing, and equipment; that he has been regularly settled with to the latest period required by the regulations; and that he is in possession of his pocket ledger, which has been regularly kept and balanced to the date of embarkation (or, if otherwise, date to be given); and, further, that the undermentioned documents were handed over to the officer commanding the troops on board the vessel in which the men embarked, with written directions as to their final disposal. (Should there be no officer proceeding in charge of the men, the documents will be forwarded by post to the Purveyor at the new station.)

No. 1 Report.
Company Defaulter sheet.
Regimental Defaulter sheet.
Court-martial sheet.
Copy of Record of Service.
Medical History sheet.
Return of necessaries in possession, and balance of account, as per Form C.

The Purveyor will be held responsible for preparing the No. 1 Report and return of necessaries, also for obtaining from the officer charged with the discipline of the men, and the medical officer, the remainder of the documents specified. At stations where there is a Captain of Orderlies, he will prepare the return of necesaries, and will be responsible for collecting and transmitting the whole of the documents.

13. Whenever non-commissioned officers and men proceed from out-stations to head-quarters for embarkation or otherwise, or are transferred from one station to another, the Purveyor will obtain the documents enumerated in the foregoing paragraph, and will forward them to the head-quarters or to the new station, as the case may be.

14. Claims for good-conduct pay preferred by men of the corps will be arranged locally by the officer under whom they are placed for discipline, who will furnish the Purveyor with the necessary documents as vouchers for his pay-list.

15. The Purveyor, at stations where there is no Captain of Orderlies, will keep a detachment savings' bank ledger, in which all sums deposited or withdrawn by men of the corps in his payment will be entered; the moneys received to be applied to the payment of public services. The balance due to each depositor is to be recorded in his Pocket-ledger, and signed on each day of monthly settlement. The Purveyor will transmit to the head-quarters of the corps, with the monthly return of the detachment, a statement, on savings' bank form No. 2, of all deposits and withdrawals during the past month, and likewise attach a similar statement on form No. 3 to the pay-list rendered to the War Office at the end of each quarter. (See Circular No. 711, W.O., 31st August, 1861.)

Where there is a Captain of Orderlies, this duty will be performed by that officer, with the exception of accounting to the public in the quarterly pay-list, which will, under all circumstances, be done by the Purveyor.

16. In all cases of transfer of men to the Army Hospital Corps from regiments serving abroad, Purveyors will be careful that the undermentioned documents are handed to them by the officer commanding the corps from which the transfer takes place, viz.:—

No 1 Report.
Copy of Record of Service.
Regimental Defaulter sheet.
Company Defaulter sheet.

Court-martial sheet.
Medical History sheet.
Clothing return. W. O. Form No. 32.
Great coat transfer return. W. O. Form 132.
Return of necessaries in possession, and balance of account as per form C.

They will forward to the officer commanding at Netley :—

The *original* Court-martial sheets.
Certified copies of Company Defaulter sheets.
Clothing return. W. O. Form No. 32.
Great coat return. W. O. Form No. 132.

And will retain :—

No. 1 Report.
The copy of Record of Service.
Regimental Defaulter sheet.
Company Defaulter sheet.
Copy of Court-martial sheets.
Medical History sheet.
Return of necessaries in possession.

As regards men transferred to the corps within the United Kingdom, the whole of their documents will be forwarded to the commanding officer at Netley by the officer commanding the battalion or regiment giving the men, except the No. 1 Report and return of necessaries, which should be sent to the Purveyor of the district in which the men are actually employed.

17. An Acquittance-roll, as per form D, Appendix, should be kept by each officer or non-commissioned officer charged with the payment of a detachment of the corps. Each issue of pay should be duly entered therein, and the roll when completed at the end of the month transmitted to the Purveyor of the district.

18. Men transferred to the corps while in receipt of good-shooting pay will continue to receive the same on a certificate being furnished by the commanding officer of the regiment from which they volunteered.

19. With reference to men of the corps who shall have been illegally absent for the space of two months, the proceedings of the Court of Enquiry ordered to assemble in conformity with the Articles of War will be forwarded to head-quarters to be preserved as a record.

20. The following Horse Guards Circular is published for general information :—

"General No. 277, 13th October, 1863.

"His Royal Highness the Field-Marshal Commanding-in-Chief is pleased to direct that any act of drunkenness committed by an army hospital orderly shall receive such punishment as necessarily entails an entry in the Regimental Defaulters' book."

21. The following rules are to be observed in the re-engagement of men of the corps who originally volunteered from other regiments, and who, on the completion of their first period of limited enlistment, desire and are found qualified to remain in the corps. They must be re-transferred to the regiment from which they volunteered, be re-engaged for that regiment, and then again be transferred to the Army Hospital Corps. This course will not necessitate reference to their former regiments, and may be carried out in a single day at any station, under the authority of the General or other officer commanding.

22. All applications for the discharge of men of the corps at home, except as invalids, or on the recommendation of a court-martial, should be made to the officer commanding the corps at Netley, who, should he approve, will submit the same to the Director-General or Purveyor-in-Chief, as the case may be, with a view to the authority of the Commander-in-Chief being obtained with reference thereto.

23. In preparing the documents of all men of the corps who are about to be discharged, a duplicate of the proceedings of the Board on W. O. Form No. 83 will be transmitted to the officer commanding the corps at Netley.

EDWARD LUGARD.

W.O. Form 301

(A.)

Army Hospital Corps.

RETURN of Volunteers, from the   Regiment, for the Army Hospital Corps.

186

Regiment	Regimental Number	Rank	Names	Age.		Service		Character — Certified Copies of the Defaulter Sheet (Regimental & Company) of each Man to accompany this Return.	Married or Single — (If Married, to be stated whether with or without Leave.	If ever employed in Hospital, in what Capacity, Period; and if ever removed, the cause of Removal.	If passed as a Compounder of Medicines — Date	If able to Read and Write	Remarks
				Years	Months	Years	Months						

I hereby certify that I have carefully examined the above-named Volunteers and find that they do not labour under any disease, and that they are fit for duty at home or abroad; and that in my opinion they are well adapted for Hospital Service.

Medical Officer in Charge

Commanding   *Regiment.*

W.O. Form 302

(B.)

Army Hospital Corps.

CASUALTY RETURN of Detachments of the above Corps serving in the District, for the Month ending 186

Regimental Number	Rank and Name		Description of Casualty	Date
		Examples for filling in this Return.		
782	Private	Jones, Henry ...	Transferred from 32nd Regiment	1st November, 1862
205	Private	Robinson, Frederick	Promoted Serjeant...	1st October, 1863
104	Private	Alexander, George	Re-transferred to 64th Regiment	1st May, 1863
206	Private	Brown, James ...	Died of Dropsy, Malta	1st June, 1862
413	Private	Janes, Frank ...	Granted good-conduct pay, 1*d*. ...	3rd July, 1863
915	Private	Bennett, George ...	Restored good-conduct pay, 1*d*. ...	5th July, 1862
1289	Private	Mowatt, Henry ...	Deprived good-conduct pay, 1*d*.	7th April, 1863
1649	Private	Ryan, Patrick ...	Discharged. On payment of compensation	5th May, 1863
504	Private	Bryant, George ...	Discharged. Unfit for further service	7th April, 1862
682	Private	Robson, James ...	Discharged. Having completed 21 years' service.	3rd August, 1863
953	Private	Scott, Frank ...	Tried by a garrison court-martial at Chatham, 10th August, 1863, and sentenced to 96 days' imprisonment with hard labour. Original confinement — 6th August, 1863. Crime—desertion.	
452	Private	Watson, Thomas ...	Imprisoned for absence	4th September, 1862
"	"	" " ...	Released, private	10th September, 1862
1142	Private	Mahoney, Frank ...	Transferred to and re-engaged for 26th Foot, and again transferred to A.H.C.	29th May, 1863
752	Private	Brothman, George...	Absent without leave	4th June, 1864
			Declared a deserter by a court of enquiry.	4th August, 1864
650	Serjt.	Atkins, Thomas ...	Absent without leave	14th to 18th June, 1863
			Confined, tried, and reduced ...	25th June, 1863

I certify that this Return includes every variation affecting the services of the men of the Army Hospital Corps, stationed at during the period specified.

(*Signature*)

W.O. Form 303

(C.)

Army Hospital Corps.

RETURN of Men of the above Corps proceeding from   to   dated at

Number	Regimental Number	RANK AND NAME	Period to which Clothed	NECESSARIES IN POSSESSION																												CLAIMS				Debts			Credits			Period to which paid	Signature of each Man
				Summer Trousers	Pair of Boots	Shirts	Fatigue Tunic	Pair of Socks	Stock and Clasp	Pair of Braces	Knapsacks complete	Forage Caps	Shoe Brushes	Tin of Blacking	Clothes Brush	Hold-all	Button Stick & Brush	Sponge	Comb	Razor	Shaving Brush	Mits	Knife, Fork, & Spoon	Small Ledger	Towels	Flannel Belts	Medals	Great Coat				Description	Amount										
																																	£	s.	d.	£	s.	d.	£	s.	d.		

(*Signature.*)

(D.)

W.O. Form 304.

Army Hospital Corps.

PAY SHEET, ACQUITTANCE, and MUSTER-ROLL of the Detachment of the above Corps at during the month of 186

Debt of last Month			Credit of last Month			Rate of Pay per diem	Good Conduct Pay	Extra pay of Cooks, Bakers, &c.	Extra Pay of Lance Serjeants, or First-Class Privates	Total amount of Pay per diem	Rank, Name, and Regimental No.	Signature of Officers or others to each Issue of Pay																															Total Number of Days' Pay each Man is entitled to	Amount of Pay received			Charges as per Remarks			Total amount of Charges			Amount of Debts			Amount of Credits			Remarks explanatory of broken periods during the Month; Sums expended on account of the Men; Articles furnished, Loss of Pay, &c., &c.	How Employed on the last Day of the Month	Signature of Man on the last Day of the Month	Signature of Officer on the last Day of the Month
£	s.	d.	£	s.	d.							1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.				
											Total £																																£																			

I certify that the above is a correct statement of the Accounts of each man in my payment.

E.H.

Circular Memorandum.
(Addressed to the Army at Home and Abroad.)

Horse Guards, S.W., 10th March, 1864.

General No. 286.

Embarkations.
1—(1864.)

Mess certificate prior to embarkation.

Much inconvenience having arisen from Officers failing to provide themselves prior to embarkation, with the prescribed form of Mess Certificate, and to cause the same to be completed in every particular, His Royal Highness the Field Marshal Commanding-in-Chief enjoins Commanding Officers to enforce strictly the provisions of the Circular dated War Office, 30th August, 1860, No. 627, a copy of which is annexed for information and guidance.

By Command,
James Yorke Scarlett, Adjutant-General.

Circular No. 627.

13.
Passage Warrant.
51.

Home and Foreign.

War Office, 30th August, 1860.

Messing arrangements on board ship.

1. The arrangements under which the contribution for the Messing of Military Officers and other public passengers on board Ship, and also their families (when not in contract vessels). is brought to the credit of the public, having been under the consideration of Mr. Secretary Herbert, he has been pleased to direct that, from and after the 1st October next, the settlement for such contribution shall be exclusively effected at the termination of the voyage: no deduction as heretofore being made from the pay advanced on embarkation.

2. At the termination of the Voyage, the Paymaster or Agent of the Regiment to which the Officer belongs, or Paymaster or Acting Paymaster of the Depôt or Detachment which he may first join, or other public Accountant into whose payment the Officer or other public passenger may be reported, will be held responsible for deducting from such person, and crediting in his public accounts, the amount of Mess contribution which shall be shown to be due by the Mess Certificate to be produced by him.

3. Officers and others about to embark on board Ship are to take care to provide themselves with the prescribed form of Mess Certificate, and to complete, or cause to be completed, the same in every particular, including the signature of the Master or Purser of the Vessel, and of the Officer Commanding the Troops on board before going on shore, or of the Officer himself when there is no Commanding Officer.

4. Military Officers and other public passengers authorized to proceed in contract Steam Vessels, or proceeding on Service without Troops from one foreign station to another, or from port to port within the same command, under special contracts made by the Commissariat, will be required as at present to pay to the owners for their families permitted to embark with them the sums for passage and messing prescribed in the contracts, of which notice should be taken in the Certificate.

5. A copy of the form of Mess Certificate is annexed hereto, and all Military Accountants should forthwith obtain an ample supply of the form by application to this Department.

B. Hawes.

W. O. Form 321.

MESS CERTIFICATE.

I Certify, that while on board the ______________ a good and sufficient Mess has been provided during the periods and for the persons under-mentioned, in every respect according to the conditions of the Admiralty Regulations.

Officers or Public Passengers			Embarked		Disembarked		Remarks
Name*	Staff or Regimental Rank or Description	Age of each Child (if any)	Where	Date of first dinner meal taken on board	Date of last dinner meal taken on board	Where	

The above is correct.

______________ ______________Master.

______________ Signature of the Officer Commanding the Troops on board, or in his absence of the Officer himself.

NOTE.—Should any person have been absent from the Ship on duty, or from other unavoidable cause, the period of such absence, and the reason thereof, is to be stated in the Column for Remarks.

This Certificate will be given to each Officer or Public Passenger, so far as it relates to himself or his family, by the Officer Commanding the Troops on board, in order to enable the Paymaster, Agent, or Accountant, into whose payment they pass after disembarkation, to settle with them for their Mess contribution, the whole amount of which is to be accounted for at the termination of the voyage, as directed by Circular No. 627,—dated 30th August, 1860.

In the case of Officers of the same Regiment or Department, and proceeding to the same Station, their names may be included in one Certificate, and intrusted to the Senior Officer mentioned therein.

* The name of a Wife, or Child, or Female Servant, is to be written at full length and to follow that of the Husband or Parent, or Mistress, as the case may be.

Sanitary.

$\frac{1}{64.}$

Departmental Memorandum.

Monthly Returns of Extras to be examined by P. M. O.

The Principal Medical Officer of each command, at home and abroad, is requested to cause the several monthly returns of extras issued to the sick of regiments, corps, or detachments, serving under his superintendence, to be sent, at the close of each period, to his office for examination, on which he will be pleased to call the attention of the medical officers in charge to any deviation from the regulations he may find in those documents; and, where deviations exist, he is requested to forward to this office the explanation of the responsible medical officer, together with all the returns, and any observations of his own which he may wish to offer.

Army Medical Department, 2nd April, 1864.

Circular No. 849. (Medical Aid Regulations.)

Home and Foreign.

$\frac{38163}{12}$

War Office,
30th January, 1864.

Medical aid to Women and Children.

The annexed Regulations, prescribing the conditions under which medical aid may be given to the sick wives and children of officers, non-commissioned officers, privates, and other persons entitled to such aid, having been approved by the Secretary of State for War, in concert with His Royal Highness the Field Marshal Commanding-in-Chief, are promulgated, for the information and guidance of officers commanding, medical officers, purveyors, and others.

Edward Lugard.

$\frac{6902}{18.}$

Regulations under which Medical Aid is to be given to Sick Wives and Children of Officers, Non-commissioned Officers and Privates, and other Persons entitled to such Aid.

I.

As some misapprehension exists regarding the meaning of Sections XII. and XIII. of the Medical Regulations relative to the Medical Attendance, &c., to which sick women and children, and other persons, are entitled at the public expense, and as inattention to these Regulations has in several instances led to irregular expenditure, it is necessary to call the attention of Commanding and Medical Officers to the conditions under which Medical Aid is granted to the persons in question, and to direct that all parties concerned shall henceforth strictly observe the following rules:—

II.

Medical Aid will be given to persons entitled thereto where there is a Military Medical Officer (or a Civil Practitioner employed at contract rates), provided the persons entitled reside within a radius of one mile of the Staff Dispensary, or of the Hospital of the station, or of such other point as may from time to time be fixed by the Secretary of State for War. But attendance cannot be claimed for women in childbirth, in the case either of the wife of an officer or of any one entitled to medical aid, unless the assistance of a midwife or medical practitioner cannot possibly be procured.

III.

The following are the persons so entitled to medical attendance and medicine:

1. Wives, children, and servants of officers;
2. Wives and children of non-commissioned officers and privates having right to quarters in barracks;
3. Wives and children of officers and of non-commissioned officers employed in paying and superintending out-pensioners;
4. Wives and children of clerks, office-keepers, orderlies, permanent labourers, and of other persons permanently employed in the military and civil departments of the Army.

IV.

Domestic servants requiring medical attendance and medicine must attend at the Hospital at fixed hours, unless their illness is of such a nature as to prevent their doing so.

V.

Neither medical attendance nor medicine can be claimed for the families of persons engaged in the Civil Departments of the Army, unless a nominal list of the persons so employed, specifying their respective occupations, be furnished on the last day of each month to the principal medical officer of the station by the head of the department to which the persons belong.

VI.

Families attended in their own quarters will receive necessary medicines, but (with the exception of the wives and children of non-commissioned officers and privates having a right to quarters in barracks) they will not be entitled to any articles of subsistence at the public expense, and no charges under this head will be allowed in future. The following are the only articles which may be issued as medical comforts to the wives and children of soldiers married with leave, and having a right to quarters in barracks, viz.: Port wine, brandy, arrowroot, and essence of beef. Each case receiving medical comforts must be invariably entered in the Medical Case-book, otherwise the expense of the articles issued will be charged to the prescribing medical officer. Medical comforts given in such cases should be demanded daily from the Purveyor on Form 1198, entered on the form of Diet-sheet printed at page 8.

VII.

At several stations, hospitals for women and children have been provided, because the limited accommodation for married persons in barracks has rendered such hospitals necessary.

VIII.

The only persons who have a claim to admission into these hospitals are the wives and children of non-commissioned officers and privates entitled to married quarters in barracks; and so long as such wives and children are under medical treatment in any such hospital, they will receive at the public expense (in addition to medical attendance and medicine) such hospital diets as may be ordered for them by the medical officers, together with such of the articles of extras specified in Article XI, paragraph 2, below, as may be deemed necessary. Male children above 10 (unless in very special cases) should not be admitted into hospitals for women and children.

IX.

No persons, other than the wives and children of non-commissioned officers and privates entitled to married quarters in barracks are entitled to admission into any of the said hospitals.

X.

If in any female hospital there be vacant beds, and if the medical officer is of opinion that any of these beds might, without detriment to those for whom the accommodation was originally intended, be temporarily set apart for the use of the sick wives and children of persons not entitled by these regulations to admission into hospital, he may, with the approval of the officer commanding, admit any such case on payment of the usual hospital stoppage; but these persons would be subject to removal in the event of the bed being required for a case entitled to admission under the regulation.

XI.

The following Regulations are to be observed in Female Hospitals, till complete arrangements can be made:—

1. At every station where a female hospital has been provided, a committee of officers may be appointed by the officer commanding at the station, who will have charge of the charitable fund connected with the institution, and

will deal with all financial matters connected with it, which may be referred to them.

A committee of ladies, selected by the committee of officers, will undertake the visitation of the hospital, and the management of extra clothing supplied by the charitable fund. They will inquire into cases of distress brought to their notice, and will make thereon such suggestions to the committee of officers as may seem to them to be necessary.

The ladies' committee may appoint a sub-committee of not fewer than three to perform the duties hereinafter mentioned.

2. The medical officer attached to the hospital will take charge of all cases of sickness admitted therein, and also of lying-in women and their infants. He will prescribe medicines for them from the surgery stores, and order diets and medical comforts from the purveyor's stores (in conformity with existing regulations as to hospital diets and extras). The scale of hospital diets will be that prescribed at page 60 of the medical regulations;* in addition to which the following extras will be allowed:—Wines, spirits, malt liquors, arrowroot, sago, eggs, milk, tea, sugar, beef tea or essence of beef, oranges and lemons; 4 oz. of oatmeal and 8 oz. of milk may also be issued on spoon diet, in lieu of 2 oz. arrowroot and 1 oz. sugar. The cases for which extras are prescribed must be invariably entered in the Medical Case-book by the medical officer, who will otherwise be held responsible for the cost of the issues.

3. The purveyor will furnish female wards with the usual ward equipments; he will see that the bed and body linen of the patients is properly washed, and that the wards are warmed and lighted to the satisfaction of the medical officer.

4. The purveyor will discharge the same duties as to repairs in female hospitals as he does in military hospitals generally.

5. The medical officer is charged with the discipline over the patients in hospital.

6. A matron (who should, if possible, be competent to act as midwife), and one more female nurses, will be allowed to each hospital, on the requisition of the Principal Medical Officer, made through the Officer Commanding to the Secretary of State for War, and will be appointed in the following manner:—

7. All applications and testimonials respecting candidates for the office of matron (who should be unmarried or a widow) will be transmitted through the officer commanding to the War Office by the ladies 'committee, who will make the necessary inquiries as to character and ability, and report the result through the same channel to the Secretary of State for War.

The matron, when appointed, will engage her nurses and other assistants, and will be held responsible for their conduct. Matrons, nurses, &c., will receive from the purveyor such pay and allowances as may be sanctioned by the War Office.

Whenever it is practicable to do so, a preference should be given in these appointments to deserving widows of non-commissioned officers, if found to be as competent as other applicants.

Local committees might select widows or unmarried daughters of non-commissioned officers to be sent to King's College Hospital for training as midwives.

The offices of matron and midwife should, when practicable, be held by the same woman.

8. Matrons and nurses in female hospitals will obey any regulations respecting discipline, and the proper discharge of their duties, which may from time to time be issued for their guidance.

9. The matron or nurse shall receive and obey the medical officer's orders in all matters relating to the care and nursing of the sick; general management and cleanliness of wards; administration of diets and medicines, of enemas, &c.: cleanliness of the sick; the warming and ventilation of the wards; and shall render to him whatever aid he may require in the wards.

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* When beef-tea diets are issued to children, 1 oz. of butter and vegetables may be added, at the direction of the Medical Officer; and when milk diets are prescribed as the most suitable for children who do not need meat or animal broth, 1 oz. of butter and 1 egg may be given as extras, if considered necessary.

10. In the event of a nurse disobeying the directions of the medical officer, or being guilty of any improper conduct, the medical officer will bring the subject to the notice of the matron, who will see that the cause of complaint is immediately removed.

11. If the medical officer is not satisfied with the result of his representation to the matron, or if he is not satisfied with the manner in which the matron conducts herself or performs her duties, he will notify the specific case directly to the committee of ladies, who will immediately take such steps as they may consider necessary, reporting the same to the War Office through the officer commanding.

12. Reprimands, suspensions, or dismissals of nurses for neglect of duty or for misconduct will proceed solely from the matron; and similar acts of discipline exercised on the matron will proceed direct from the ladies' committee.

13. When subscriptions have been raised for supplying articles for clothing, &c., to women and children while in the hospital, the sub-committee of ladies already mentioned will superintend the issue of such clothing, and the matron or nurse, as the case may be, will account to the sub-committee for all articles issued.

14. The ladies of the sub-committee will be entitled to visit the hospital daily at such times as the medical officer may appoint, and will also have the power at any other time of visiting patients who may specially send for any of them.

15. During such visits the ladies will not interfere with the treatment or nursing of the sick; but if any matter comes to their knowledge which in their estimation concerns the welfare of the patients, they will, if it refers to nursing duties, bring it to the notice of the matron, or if it concerns the matron herself, they will bring it before the ladies' committee.

16. Chaplains will have the power of visiting the sick at such times as may be arranged in concurrence with the medical officer in charge, and at other times when they are specially sent for by patients.

17. Friends of patients in hospital will be admitted at times appointed by the medical officer.

XII.

At stations where no female hospitals are allowed, there will be no objection to the allotment of a room in barracks, if available, as a ward for the reception of such cases of sick women and children as it may be deemed expedient to remove from their quarters; and equipment and fuel and light will be provided for any such ward by the purveyor; but it is to be distinctly understood that under no circumstances will any expense for diet or nursing be admitted as a charge against the public.

EDWARD LUGARD.

STATION Case Book, Vol. , p.

Month of 186

Extra Sheet of

Date	Quantities to be entered in words				Initial of Medical Officer (First time name in full)
	Arrow Root	Brandy	Port Wine	Essence of beef	
	oz.	oz.	oz.		
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
Total ..					

I certify that the above extras were absolutely necessary for under my medical treatment for

Medical Officer.

I certify that is the of a soldier belonging to my regiment, who has been married with leave, and I approve of the issue of the extras above mentioned.

Officer Commanding.

(This Diet-sheet to be sent to the Purveyor at the end of the month, or earlier if the necessity for the extras has ceased.)

W.O. Form 1198.

Station ________________

Date ________________ 186

Required the following extras :—

Arrow root	ounces*
Essence of beef	¼-lb. tins
Brandy	ounces
Port wine	ounces

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* Quantities in words.

I certify that the above extras are absolutely necessary for ____________ under my medical treatment for ____________

____

Medical Officer.

I certify that ____________ is the ____________ of a soldier belonging to my regiment, who has been married with leave, and that I approve of the above issue.

____

Officer Commanding.

The requisition to be made daily, but the Commanding Officer's certificate will be necessary only on the first and last requisition in each separate case under treatment.

Circular Memorandum.
(Addressed to the Army at Home.)
Horse Guards, S.W., 4th May, 1864.

No. 296.

Hospital Orderlies.
1—(1864.)

Permanent Hospital Servants reduced from 5 to 4.

His Royal Highness the Field Marshal Commanding-in-Chief, at the instance of the Secretary of State for War, hereby notifies that a reduction from five to four is to be made in the number of permanent hospital servants.

Should the sick at any time exceed the number for which four attendants are deemed sufficient, there will be no objection to the employment of additional orderlies, under the conditions specified in Articles 212–216 of the Purveyor's Regulations.

By command,
JAMES YORKE SCARLETT, Adjutant-General.

No. 147.

Circular Memorandum.
Quartermaster-General's Office,
Horse Guards, 7th June, 1864.

Provisions, Medical Comforts, &c.

Officers superintending the embarkation of troops are informed, in reference to the 34th clause of the Form of Inspection Report, mentioned in the Circular Memorandum from this office, No. 139, dated 20th May, 1863, that when provisions, medical comforts, &c., are issued from a *Government depôt* for the use of troops, &c., embarking on board vessels engaged by the Admiralty, they are not to be examined by the inspecting officers.

RICHARD AIREY, Quartermaster-General.

Statistical Branch.
No. 8.

Circular.
Army Medical Department, 10th June, 1864.

Weekly Returns of Sick, and of Killed and Wounded.

Sir,—As it is important that this department should always be in possession of the most recent details relative to the health of the troops, whether European or Native, employed on active service or detached on special duty, I have the honour to request you will be good enough to instruct the Senior Medical Officer with such troops, when detached from the force under your supervision, to furnish regularly, direct to this office, by the earliest available opportunity, weekly returns of sick on the enclosed form, with returns of killed and wounded on W.O. forms 151 and 151A.

These returns must commence from the date on which the troops proceed on service, and must be continued each Friday until the operations are concluded, and the troops return to head-quarters. They must be distinctly marked in ink above the heading "Troops on Active Service."

You will continue to receive for such force, and transmit to me, the usual returns as required by the Regulations.

You will be pleased to acknowledge the receipt of this circular, and to specify the date on which you have communicated these instructions to the medical officers in the command.

I have, &c.,
J. B. GIBSON, Director-General.

The Principal Medical Officer, &c.

Circular.

Horse Guards, S.W., 2nd August, 1864.

Marking of Soldiers.

Sir,—His Royal Highness the Field Marshal Commanding-in-Chief desires that when the necessity for marking a soldier with the letters B.C. or D. occurs, the operation shall be performed by the drum or trumpet-major at the orderly room, in the presence of the adjutant and under the immediate supervision of a regimental or staff medical officer.

You will be pleased to cause a copy of this circular to be sent to each regiment in your command.

I have, &c.,
J. Yorke Scarlett, Adjutant-General.

The General or other Officer
Commanding at

Circular Memorandum.

(Addressed to General Officers Commanding Districts at Home, and Officers Commanding Depôt Battalions.)

Horse Guards, S.W., 9th August, 1864.

Gen. No. 307.

Hospital Orderlies.
2—(1864).

Hospital Servants, Depôt Battalions.

His Royal Highness the Field Marshal Commanding-in-Chief is pleased to direct that the operation of Circular Memorandum, dated 3rd October, 1862, No. 224, shall be extended to depôt battalions, unnecessary expense having been incurred through a proportion of the permanent hospital staff not having accompanied detachments to out-stations.

Officers commanding depôt battalions will, henceforth, be held responsible for attendance on the sick of detachments being provided for in accordance with the terms of the above quoted Circular.

By command,
A. Horsford, Deputy Adjutant-General.

Circular Memorandum.

(Addressed to the Army at Home and Abroad.)

Horse Guards, S.W., 3rd October, 1862.

Gen. No. 224.

Due proportion of Hospital Servants to be with Detachment Hospitals

His Royal Highness the General Commanding-in-Chief desires that, when regiments are divided, and detachment hospitals necessarily opened, a due proportion of the permanent hospital staff be attached thereto, for ward duty, according to the strength of detachments, and probable average number of sick.

It is anticipated that the liberal permanent staff, now allowed for hospital duty, will be equal to all ordinary requirements, but there will be no objection to the issue of diets to special orderlies, in accordance with the War Office Circular No. 733, of the 1st January, 1862, when such are necessarily required at the regimental head quarters, in addition to the number of permanent orderlies left there for duty, after providing for the wants of detachment hospitals.

By command,
James Yorke Scarlett, Adjutant-General.

Circular Memorandum.

(Addressed to the Army at Home and Abroad.)

Horse Guards, S.W., 27th August, 1864.

General Number 311.

Medical Officers.
2—(1864).

Transfer of 3rd Assistant Surgeons.

His Royal Highness the Field Marshal Commanding-in-Chief, with the concurrence of the Secretary of State for War, approves of the transfer to the new brigades of Foot Artillery, or to the Staff of the 3rd Assistant Surgeons of all Infantry Regiments in India as have still three.

These officers will be exempted from the payment of the entrance band and mess contributions to the corps to which they may be transferred, they having made these payments in their present regiments, and they will only be called upon hereafter to pay the annual subscription while serving.

Those assistant surgeons who may be transferred to the staff, and have not been eighteen months with their present regiments, will have their entrance band and mess contributions returned to them.

Mess and Band Contributions of Medical Officers.

His Royal Highness also approves that, for the future, *all* medical officers who may have paid mess and band entrance contributions to one regiment, shall not be required to pay the same again to any other regiment, should they be transferred for the convenience and benefit of the service, and not at their own request.

By command,
A. Horsford, Deputy Adjutant-General.

Departmental Memorandum.

Sanitary 3.
64.

Army Medical Department, 7th September, 1864.

Sanitary Reports of Principal Medical Officers.

The principal medical officers of stations abroad will, for the future, in the first two monthly Sanitary Reports of each quarter, or at all ordinary times, when no special circumstances of sickness or field service exist, merely state whether the sanitary conditions continue the same as in the previous period, or whether any, and if so, what change has occurred. In the last monthly Sanitary Report of the quarter, the full detail, as heretofore, is always to be afforded. It is considered that this arrangement will obviate redundant work, and fulfil all the requirements of the regulations. In the event, however, of any occurrence taking place of more than ordinary consequence, affecting or likely to affect the health of the troops, each monthly sanitary report must be furnished, as formerly, in full detail.

(Signed) T. G. Logan, Inspector-General of Hospitals,
for the Director-General.

**The Principal Medical Officers, Bengal, Madras,
Bombay, and Ceylon.**

Circular Memorandum.
(Addressed to the Army at Home and Abroad.)

Horse Guards, S.W., 11th October, 1864.

Gen. No. 815.

Passages.
1—(1864).

Passages.

His Royal Highness the Field Marshal Commanding-in-Chief, at the instance of the Secretary of State for War, desires that officers proceeding to join their corps at foreign stations at the public expense, shall not engage their own passages until it has been ascertained whether passages can be provided, or that the financial authorities are prepared to issue an allowance for that purpose.

By Order of His Royal Highness,
The Field Marshal Commanding-in-Chief,
James Yorke Scarlett, Adjutant-General.

Circular No. 876. (Hospital Camp Equipage.)
7561
30
Home and Foreign (exclusive of India).

War Office, 20th October, 1864.

Custody of Hospital Stores.

Sir,—I am directed to inform you, that the Secretary of State for War has decided that it is the duty of the Purveyor to bring on his charge, and be responsible for the due custody of all hospital marquees and other stores kept expressly for hospital use on home and foreign stations; but in cases where the Purveyor has not sufficient store room for this purpose, and additional accommodation, without hiring, cannot be placed at his disposal, Lord de Grey considers it desirable, to avoid expense, that the military store officer, having sufficient spare room, should keep the reserve stores on the Purveyor's account, to be issued at once on the simple requisition of that officer. The hospital stores retained by the military store department will be surveyed as laid down by Circular No. 498, and reported to the general officer as being in good repair and fit for immediate use.

In order to carry out the above arrangement, you will be pleased to assemble a board of officers (of which the Principal Medical Officer, the Purveyor, and the Military Store Officer should be members), to determine the number of marquees and tents which it is considered desirable to set apart for hospital purposes at the station or district under your command, and to forward the Report of such Board for the consideration of the Secretary of State for War.

I have, &c.,
EDWARD LUGARD.

To General or other Officers Commanding
at Home and Abroad.

Circular No. 883. (Travelling Allowances.)

Victoria R. Home and Foreign (exclusive of India).

14
Civilians
1109.

Regimental Travelling Allowance.

Whereas We have judged it expedient to revise that part of Our Royal Warrant of 23rd December, 1857, which prescribes the rates of personal allowance for officers of Our Army when travelling on duty without troops: Our Will and pleasure is, that from the date of this Our Royal Warrant, the rates of personal allowance for such officers shall be, 20*s.* a-day for general officers, 15*s.* a-day for field officers, and 10*s.* a-day for captains and subalterns.

Given at Our Court at St. James', this twenty-first day of November, 1864, in the 28th year of Our reign.

By Her Majesty's Command,
DE GREY AND RIPON.

Medical.

Army Medical Department, 5th November, 1864.

Employment of Extra Orderlies regulated and defined.

Sir,—The employment of extra orderlies to attend on special cases in hospitals where the permanent establishment is amply sufficient for the performance of all the duties entailed upon it, having attracted the attention of the War Office authorities, I am directed to refer the matter for the serious consideration of yourself and the medical officers serving under you, and to request you will have the goodness to see, that not only the demands for such extra orderlies are limited to cases of absolute necessity, but that the charges of free entire diets to such men are supported by a statement of the manner in which the permanent hospital servants were employed at the time, and also by the special reasons for considering an extra attendant necessary.

You will be pleased further to press upon medical officers the importance of strictly adhering to the regulations laid down for their guidance on this subject, as by so doing they will save much unnecessary correspondence, and relieve me from the disagreeable duty of disallowing charges which I cannot approve.

It should also be borne in mind that under no circumstances should the charge of serious cases of disease or injury be delegated to men temporarily employed from the ranks, when trained hospital servants can be made available for that duty.

I have, &c.,
J. B. GIBSON, Director-General.

The Principal Medical Officer.

Medical.

Circular Memorandum.

Army Medical Department, 6th November, 1864.

New Regimental Service Return to be used.

On and after the 31st December, 1864, medical officers in charge of regiments and of detachments at home and abroad (exclusive of India), will forward to the Director-General, Army Medical Department, through their respective principal medical officers, a return on the enclosed form (War Office Form 1014), of the non-commissioned officers and men employed in the hospitals under their charge.

This circular does not apply to Depôt Battalion or other hospitals, the establishments of which are supplied from the Army Hospital Corps, and accounted for on War Office Form 1013.

J. B. GIBSON, Director-General.

REGIMENTAL HOSPITAL SERVICE.

RETURN of Men employed in the Hospital of the Regiment for the month ending , 18 .
Station, Date

Distribution of permanent Hospital Establishment and average daily Sick under Treatment in each Hospital	Wardmaster	Steward	Cook.	Orderlies	Extra Orderlies	Total
Regimental Hospital at (daily average of sick, No.).						
Detachment Hospital at (daily average of Sick, No.).						
Total						
Establishment allowed by existing Regulations						

NAMES of Men who have joined the Hospital Service, or have been employed as Extra Orderlies during the month.

Reg. No.	Rank and Name.	Date of Joining.	Special reason for their Employment.

NAMES of Men of Hospital Establishment who have returned to duty in the ranks or become Non-effective during the month.

Reg. No.	Rank and Name.	Date of becoming Non-effective.	Cause.

NOMINAL Return of Hospital Servants.

No.	Rank and Name.	In what Capacity Employed.	Remarks on Character (Medical Officers to Report fully on Ability and Efficiency).

I certify that the Regimental Hospital Establishment is complete; that the Non-Commissioned Officers and Orderlies are thoroughly trained in their several duties according to Instructions dated 1st March, 1864; and that no entire diets have been issued to Extra Orderlies beyond those sanctioned by Regulation, and correctly accounted for in the body of this Return.

Surgeon, *Regiment.*

Circular No. 882. Army Hospital Corps Allowances.

Home and Foreign (exclusive of India).

41
A. H. Corps
160

War Office, 29th November, 1864.

Serjeants of the A. H. Corps.

With reference to the Royal Warrant of 27th September, 1861, Circular 715, the Secretary of State for War has directed the 1st and 2nd class serjeants of the Army Hospital Corps to be added to the 5th column (infantry) of Class B of the Schedule of Classification in Circular 698; their allowances will be regulated accordingly on the regimental scale.

HARTINGTON.

Circular Memo. (Personal Allowances, War Office.)
W.O. No. 8.

14
Civilians
1109

War Office, 17th November, 1864.

War Office Personal Travelling Allowance.

The Secretary of State for War having had under further consideration the regulations contained in Circular 548, and Circular Memorandum, dated 25th August, 1863, has decided that, from the date of this circular, the rates of personal allowance to civilians and military officers employed in this department, when travelling on duty, shall be as under:—

War Office Civilians.	
Heads of departments	20*s*. per diem.
Others	15*s*. "
Military officers employed under the War Office.	
Not being general officers	15*s*. per diem.
General officers, being allowed as such	20*s*. "

HARTINGTON.

INSTRUCTIONS to Medical Officers proceeding to Calcutta in charge of British Troops.

Army Medical Department, 19th January, 1865.

Instructions for the Calcutta voyage.

1. You will make arrangements so that you may be in readiness to disembark as speedily as may be necessary after your arrival at Calcutta.

2. You will have any men who are seriously ill held in readiness to be sent to the depôt hospital there, and have abstracts (in duplicate of each case) and their "medical certificates" ready.

3. The following documents will be required from you by the inspecting medical officer of Her Majesty's British forces, viz.:—

(*a*). Nominal return of men to be sent to the depôt hospital.
(*b*). Return of sick on board, as per W. O. Form 294B.
(*c*). A separate report on Sickness, and medical transactions during the voyage.
(*d*). A return of medical comforts, as per page 111 of the Medical Regulations.
(*e*). Copies of correspondence on professional points on board.
(*f*). Nominal list of women who have been sick during the voyage.
(*g*). Nominal list of children who have been sick during the voyage.

Each of the above in duplicate.

4. You will also give him the copy of the New Transport Regulations with which you may have been provided for use during the voyage.

5. The following books and forms must be completed prior to your arrival at Calcutta, viz.:—

(*a*). Admission and Discharge Book, Form G, pages 118 and 146 Medical Regulations.

(*b*). Medical Case-book to be accurately kept, Form L, pages 121 and 158 of the Medical Regulations.
(*c*). Medical Histories Sheet of Men, Form F, pages 116 and 144 of the Medical Regulations.
(*d*). The Requisition-book for Comforts.

6. You will be prepared to give the inspecting medical officer of Her Majesty's British forces information upon the following points, namely :—

(*a*). Date of departure of the vessel from the port where the troops embarked, and the name of the port.
(*b*). Length of passage in days.
(*c*). State of health of troops on board.
(*d*). Whether the ship has been provided with every requisite, with especial reference to the amount and quality of provisions, in accordance with the scale, water, medicines, instruments, and comforts.
(*e*). Whether she has been kept in a good sanitary condition, in respect of ventilation, cleanliness, means of ablution, &c.
(*f*). Whether the accommodation has been sufficient; giving the superficial area and cubic contents per man of sleeping accommodation.
(*g*). Whether any defects have been discovered during the voyage.
(*h*). The number of officers, of men, of women, and of children embarked,
(*i*). The deaths in each class.
(*j*). The number of births during the voyage.
(*k*). The prevailing diseases on board, and the cause.
(*l*). The nature of the accommodation for the reception and treatment of the sick, including the superficial area and cubic contents per sick bed, the means and state of ventilation, &c.

7. The inspecting medical officer of Her Majesty's British forces will give you instructions in regard to your further movements and requirements, but you will be pleased, in order to facilitate duty, to have ready upon paper the questions which you desire to ask him.

8. You will, as soon after arrival as possible, report yourself personally at the office of the Principal Medical Officer of Her Majesty's British forces, Calcutta.

J. B. GIBSON, Director-General.

NOTE.—The nominal lists of men, of women, and of children, should be a transcript from the Admission and Discharge Book of each class.

Medical Branch No. 1, 65.

Circular Memorandum.

Army Medical Department, 10th March, 1865.

Damage to Hospital Stores in transit.

Regimental medicine chests, fracture boxes, and other articles of hospital equipment, having been recently in many instances injured by rough usage during transit from one station to another, or the contents damaged from bad and insufficient packing, the attention of medical officers is directed to this subject; and it is requested that in future due care be taken in the packing and cording of chests, &c., previous to a move, and that every effort be made to ensure care in transit.

In all cases the medicine chests should be distinctly marked—"Glass, with care."

When losses from breakage occur, or other injuries are sustained, during the transit of the hospital equipment in question, the medical officer in charge should apply to his immediate commanding officer to assemble a board of officers for the purpose of investigating the cause of such damage, and recording the circumstances under which it occurred, and the parties responsible for the same. The proceedings, when approved by the officer commanding, should be returned to the medical officer for transmission to this department, in order that the necessary steps may be taken to replace the articles destroyed, or repair the damage. In all other cases of loss or damage to medical equipment, the medical officer will be guided by the instructions contained in the Medical Regulations, at page 80.

J. B. GIBSON, Director-General.

Circular No. 906. (Medical Aid Regulations.)
Home and Foreign.

$\frac{38,163}{23}$ War Office, 25th March, 1865.

Attendance in dangerous cases of labour.

With reference to Clause 2 of Circular No. 849, the Secretary of State for War directs that, in the event of the midwife or private practitioner therein referred to, requiring the assistance of a military medical officer in any case of danger, it shall be the duty of such officer to render the necessary aid.

EDWARD LUGARD.

THE GENEVA CONVENTION.

The following are the ARTICLES of the CONVENTION signed at Geneva, August 22, 1864, for the amelioration of the condition of the wounded in armies in the field, and acceded to by the British Government on the 18th February, 1865.

ARTICLE I.

Ambulances and military hospitals shall be acknowledged to be neuter, and, as such, shall be protected and respected by belligerents so long as any sick or wounded may be therein.

Such neutrality shall cease if the ambulances or hospitals should be held by a military force.

ARTICLE II.

Persons employed in hospitals and ambulances, comprising the staff for superintendence, medical service, administration, transport of wounded, as well as chaplains, shall participate in the benefit of neutrality whilst so employed, and so long as there remain any wounded to bring in or to succour.

ARTICLE III.

The persons designated in the preceding Article may, even after occupation by the enemy, continue to fulfil their duties in the hospital or ambulance which they serve, or may withdraw in order to rejoin the corps to which they belong.

Under such circumstances, when those persons shall cease from their functions, they shall be delivered by the occupying army to the outposts of the enemy.

ARTICLE IV.

As the equipment of military hospitals remains subject to the laws of war, persons attached to such hospitals cannot, in withdrawing, carry away any articles but such as are their private property.

Under the same circumstances an ambulance shall, on the contrary, retain its equipment.

ARTICLE V.

Inhabitants of the country who may bring help to the wounded shall be respected, and shall remain free. The generals of the belligerent powers shall make it their care to inform the inhabitants of the appeal addressed to their humanity, and of the neutrality which will be the consequence of it.

Any wounded man entertained and taken care of in a house shall be considered as a protection thereto. Any inhabitant who shall have entertained wounded men in his house shall be exempted from the quartering of troops, as well as from a part of the contributions of war which may be imposed.

ARTICLE VI.

Wounded or sick soldiers shall be entertained and taken care of, to whatever nation they may belong.

Commanders-in-Chief shall have the power to deliver immediately to the outposts of the enemy soldiers who have been wounded in an engagement, when circumstances permit this to be done, and with the consent of both parties.

Those who are recognized, after their wounds are healed, as incapable of serving, shall be sent back to their country.

The others may also be sent back, on condition of not again bearing arms during the continuance of the war.

Evacuations, together with the persons under whose directions they take place, shall be protected by an absolute neutrality.

ARTICLE VII.

A distinctive and uniform flag shall be adopted for hospitals, ambulances, and evacuations. It must, on every occasion, be accompanied by the national flag. An arm-badge (*brassard*) shall also be allowed for individuals neutralized, but the delivery thereof shall be left to military authority.

The flag and the arm-badge shall bear a red cross on a white ground.

ARTICLE VIII.

The details of execution of the present Convention shall be regulated by the Commanders-in-Chief of belligerent armies, according to the instructions of their respective Governments, and in conformity with the general principles laid down in this Convention.

ARTICLE IX.

The High Contracting Powers have agreed to communicate the present Convention to those Governments which have not found it convenient to send plenipotentiaries to the International Conference at Geneva, with an invitation to accede thereto; the protocol is for that purpose left open.

ARTICLE X.

The present Convention shall be ratified, and the ratifications shall be exchanged at Berne in four months, or sooner if possible.

In witness whereof the respective plenipotentiaries have signed the same, and have affixed thereto the seal of their arms.

Done at Geneva, the twenty-second day of August, one thousand eight hundred and sixty-four.

(Signed) * * * * *

And the Swiss Confederation having, in virtue of Article IX of the said Convention, invited the Government of Her Britannic Majesty to accede thereto;

The undersigned, Her Britannic Majesty's Principal Secretary of State for Foreign Affairs, duly authorized for that purpose, hereby declares that the Government of Her Britannic Majesty fully accedes to the Convention aforesaid.

In witness whereof he has signed the present act of accession, and has affixed thereto the seal of his arms.

Done at London, the eighteenth day of February, in the year of our Lord one thousand eight hundred and sixty-five.

(L.S.) RUSSELL.

NOMINAL ROLL OF MEDICAL OFFICERS SERVING ON FULL PAY.*

DIRECTOR-GENERAL.

Sir James Brown Gibson, M.D., K.C.B., Honorary Physician to the Queen (7th March, 1860).

INSPECTORS-GENERAL OF HOSPITALS.

Name.	Date of Commission.	Date of Entry into the Service.	Station.
Thomas Galbraith Logan, M.D., C.B., Honorary Physician to the Queen.	8 April 1859	8 May 1828	London.
Wm. Mure Muir, M.D., C.B.	15 Feb. 1861	22 Nov. 1842	Canada.
Thomas David Hume, M.D.	31 Dec. „	26 Oct. 1826	Malta.
Arthur Anderson, M.D. ..	28 Jan. 1862	16 „ 1835	Netley.
Geo. Stewart Beatson, M.D.	1 May 1863	13 July 1838	Bengal.
Samuel M. Hadaway ..	11 Aug. „	22 Nov. 1827	Dublin.
Thos. Ross Jameson, M.D.	17 Nov. „	10 Jan. 1834	Portsmouth.
V.C. James Mouat, C.B...	18 Oct. 1864	14 Dec. 1838	New Zealand.

DEPUTY INSPECTORS-GENERAL OF HOSPITALS.

Name.	Date of Commission.	Date of Entry into the Service.	Station.
Robert Lawson	8 Dec. 1854	15 May 1835	Cape of Good Hope.
Arch. Gordon, M.D., C.B...	25 Jan. 1856	27 June 1836	Mauritius.
John Drope McIlree ..	31 Dec. 1858	20 Feb. 1835	Nova Scotia.
George Taylor, M.D... ..	„ „	16 May 1834	Shorncliffe.
Joshua Paynter	„ „	11 Jan. 1839	Manchester.
Patrick Gammie..	„ „	17 June 1836	Bombay.
Richard Dane, M.D... ..	„ „	17 July 1835	Colchester.
Fras. Wm. Innes, M.D., C.B.	„ „	10 Feb. 1837	Portsmouth.
John Fraser, M.D., C.B. ..	„ „	20 Aug. 1841	Ceylon.
John Harry Ker Innes, C.B.	„ „	8 April 1842	Bengal.
Thomas Longmore, Prof. of Clin. and Mil. Surgery	„ „	3 Feb. 1843	Army Medical School, Netley.
Samuel Currie, M.D., C.B.	18 Jan. 1859	14 Oct. 1836	Edinburgh.
Richard James O'Flaherty	19 July „	9 Jan. 1835	Dublin.
Thos. Graham Balfour, M.D.	22 „ „	29 April 1836	London.
Chas. A. Gordon, M.D., C.B.	11 May 1860	8 June 1841	Bengal.
William Rutherford, M.D.	15 Feb. 1861	2 July „	Gibraltar.
James McGregor	28 Jan. 1862	24 July 1834	West Indies.
John Bent	„ „	25 April 1838	Jamaica.
William Dick, M.D.	17 Mar. 1863	13 May 1836	Hong Kong.
Robt. K. Prendergast ..	24 „ „	7 Oct. „	Curragh.
Jas. G. Inglis, M.D., C.B...	1 May „	29 Mar. 1839	Madras.
J. W. Chambers, M.D. ..	„ „	4 Oct. „	Woolwich.
F. C. Annesley	11 Aug. „	17 Sept. „	Devonport.
Jas. Alex. Fraser, M.D. ..	17 Nov. „	20 Dec. „	Chatham.
Richard Coffin Elliot, C.B.	11 Oct. 1864	7 June „	
Alexander Gibb, M.D. ..	18 „ „	10 Jan. 1840	New Zealand.
Local Rank.			
William C. Maclean, M.D., Prof. Clin. and Mil. Med.	9 April 1861	..	Army Medical School, Netley.

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* Corrected to 31st of March, 1865.

SURGEONS-MAJOR.

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
James Guy Piers Moore	8 Dec. 1854	3 Mar. 1837	Staff.
John Gillespie Wood, M.D.	9 Feb. 1855	11 Jan. 1839	Staff.
Wm. Leslie Langley, M.D.	16 „ „	„ „	Staff.
Henry Cooper Reade	1 May „	31 „ 1839	Staff.
John Mure, M.D.	6 July „	4 Oct. „	Staff.
William Sall, M.D.	20 „ „	10 May „	Staff.
Henry Downes, M.D.	7 Sept. „	1 Nov. „	Staff.
John Ashton Bostock, M.D., Hon. Surg. to the Queen	20 Mar. 1857	8 Feb. 1842	Scots Fusilier Guards.
George Eleazer Blenkins	24 Jan. 1858	13 April 1838	Grenadier Guards.
Thomas Patrick Matthew	31 Aug. „	12 Dec. 1843	Staff.
A. Maclean	1 Oct. „	4 Oct. 1833	1st Depôt Battalion
John Grant	„ „	9 June 1837	Staff.
James Somerville Litle	„ „	2 Nov. 1836	Royal Artillery.
George Thomas Ferris	„ „	26 Sept. 1837	Royal Artillery.
Melborne Broke Gallwey	„ „	24 April 1838	Staff.
Wm. Ord Mackenzie, M.D.	4 Jan. 1859	4 Jan. 1839	3rd Hussars.
Joseph Burke	10 Jan. 1860	10 Jan. 1840	1st Bat., 3rd Foot
Robt. Carew Anderson, M.D.	22 May „	22 May „	Staff.
Wm. Hen. Mackintosh, M.D.	„ „	„ „	Staff.
John Summers, M.D.	29 „ „	29 „ „	91st Foot.
Charles R. Nicoll	26 June „	26 June „	1st Bat., Gren. Gds.
John Burton St. Croix Crosse	9 Oct. „	9 Oct. „	11th Hussars.
Richard Geo. Davys Banon	30 „ „	30 „ „	Staff.
Jas. McGrigor Grant, M.D.	6 Nov. „	6 Nov. „	Staff.
Jas. Carroll Dempster, M.D.	29 Dec. „	29 Dec. „	35th Foot.
Edward Scott Docker	„ „	„ „	Staff.
William Campbell Seaman, M.D.	16 Feb. 1861	16 Feb. 1841	72nd Foot.
Henry Clinton Foss	26 „ „	26 Feb. „	1st Bat., 2nd Foot
George Williamson, M.D.	26 Mar. „	26 Mar. „	64th Foot.
William Kilner Swettenham, M.D.	9 April „	9 April „	1st Bat., 5th Foot.
William Arden	„ „	„ „	14th Hussars.
Robert Bowen	18 May „	18 May „	1st Bat., Rifle Brigade.
Jas. John Marjoribanks Wardrop	21 „ „	21 „ „	2nd Bat., Gren. Gds.
John Ewing	„ „	„ „	62nd Foot.
Thomas Waller Barrow	8 June „	8 June „	Staff.
Ludovic Charles Stewart	„ „	„ „	78th Foot.
Richard Gamble, M.D.	„ „	„ „	1st Bat., 24th Foot.
Nesbitt Heffernan, M.B.	11 June „	11 „ „	Staff.
Thomas Joliffe Tufnell	„ „	„ „	Staff.
Henry Briscoe M.D.	27 Aug. „	27 Aug. „	Royal Artillery.
Augustus Purefoy Lockwood	17 Sept. „	17 Sept. „	2nd Dragoons
Cosmo Gordon Logie, M.D.	5 Oct. „	5 Oct. „	Royal Horse Guards.
Orlando Sawle Donnall	19 „ „	19 „ „	Staff.
Edward Menzies	29 Oct. „	29 Oct. 1841	Staff.
Ethelbert Hen. Blake, M.D.	16 Nov. „	16 Nov. „	Royal Artillery.
James Richard Ffennell	20 „ „	20 „ „	2nd Bat., 16th Foot.
James Macbeth, M.D.	3 Dec. „	3 Dec. „	16th Lancers.
Richd. Fras. Valpy De Lisle	10 „ „	27 Aug. „	Royal Artillery.
Thos. Goldie Scott, M.D.	14 „ „	14 Dec. „	79th Foot.
John Elliot Carte, M.B., C.B.	31 „ „	31 „ „	2nd Bat., 14th Foot.
Huntley Geo. Gordon, M.D.	„ „	„ „	69th Foot.
Thomas Guy, M.D.	28 Jan. 1862	28 Jan. 1842	Royal Artillery.
Robert M'Wharrie, M.D.	11 Mar. „	11 Mar. „	59th Foot.
Sandford McVittie Lloyd, M.D.	2 April „	5 „ 1841	Staff.
Wm. Green Trousdell, M.D.	8 „ „	8 April 1842	1st Bat., 11th Foot.

SURGEONS-MAJOR—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
Patrick Sinclair Laing ..	8 April 1862	8 April 1842	2nd Bat., 23rd Foot.
Benjamin Swift, M.D. ..	„ „	„ „	1st Bat., 14th Foot.
Charles Bush Hearn ..	15 „ „	15 „ „	1st Bat., 1st Foot.
V.C. Joseph Jee, C.B. ..	„ „	„ „	1st Dragoons.
Thomas Best	22 „ „	22 „ „	68th Foot.
Edward Howard	29 „ „	29 „ „	1st Bat., 20th Foot.
Henry Lionel Cowen ..	17 June „	17 June „	Ceylon Rifles.
Miah W. Murphy	22 July „	22 July „	Staff.
Edward Moorhead, M.D...	2 Aug. „	2 Aug. „	29th Foot.
Francis Reid, M.D. ..	„ „	„ „	Staff.
Hugh Crawford Walshe, M.D.	3 Sept. „	3 Sept. „	Royal Artillery.
Benj. Wm. Marlow, M.D...	25 Oct. „	25 Oct. „	Staff.
John Wyatt	9 Jan. 1863	20 May 1851	Coldstream Guards.
Luke Barron, M.D. ..	7 May „	10 July 1840	Staff.
George C. Meikleham, M.D.	16 June „	16 June 1843	Staff.
Robert Marshall Allen ..	30 „ „	30 „ „	3rd Dragoon Guards.
Eneas Mackintosh Macpherson	6 Sept. „	21 Aug. 1840	Staff.
Vere Webb..	13 Oct. „	13 Oct. 1843	Staff.
John Mullins	„ „	„ „	Staff.
David Reid Mackinnon ..	12 Dec. „	12 Dec. „	Staff.
Alexander Barclay, M.D. ..	22 „ „	22 „ „	Staff.
Alfred Crocker	26 Jan. 1864	26 Jan. 1844	2nd Bat., 3rd Foot.
William Godfrey Watt ..	1 March „	1 Mar. „	15th Hussars.
Jas. M. Scott Fogo ..	5 „ „	5 „ „	Royal Artillery.
John Wm. Mostyn, M.D...	8 „ „	8 „ „	76th Foot.
John Thomas Watson Bacot	10 May „	10 May „	89th Foot.
Raphael Woolman Read ..	31 „ „	31 „ „	30th Foot.
John Wm. Johnston, M.D.	28 June „	28 June „	85th Foot.
Wm. Holmes Jephson, M.D.	12 July „	12 July „	1st Dragoon Guards.
Chas. Hunter Fasson, M.D	12 „ „	12 „ „	1st Bat., 17th Foot.
John Grogan, M.B. ..	19 Aug. „	16 April 1841	4th Dragoon Guards.
Edward Baily Tuson ..	20 „ „	20 Aug. 1844	2nd Bat., 17th Foot.
Edward Gilborne	28 „ „	28 „ „	Royal Artillery.
John A. W. Thompson, M.D.	19 Nov. „	19 Nov. „	80th Foot.
Hampden Hugh Massy, M.D.	22 „ „	22 „ „	Staff.
William Munro	6 Dec. „	6 Dec. „	93rd Foot.
William Barrett, M.B. ..	18 „ „	20 Oct. 1843	71st Foot.
Geo. Aug. Fred. Shelton, M.B.	3 Jan. 1865	3 Jan. 1845	48th Foot.
William George Swan, M.D.	28 Feb. „	28 Feb. „	1st Bat., 16th Foot.
James Mee	28 Mar. „	28 Mar. „	Royal Artillery.

SURGEONS.

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
Wm. Freeman Daniell, M.D.	11 Mar. 1853	26 Nov. 1847	Staff.
George Fredk. Bone, M.D. ..	21 Oct. „	9 Dec. 1845	Royal Artillery.
Thomas Parr	„ „	21 July 1846	55th Foot.
Robert Lewins, M.D. ..	3 Mar. 1854	13 Dec. 1842	Staff.
George William Powell ..	28 „ „	20 Aug. 1844	Staff.
Wm. Fredk. Torcato Ivey ..	15 Aug. „	30 May 1845	Staff.
Fras. Hastings Baxter, M.D.	„ „	11 July „	12th Lancers.
Henry Kendall, M.D. ..	6 Oct. „	16 Dec. „	7th Hussars.
George Saunders	20 „ „	„ „	9th Foot.
Thomas Moorhead, M.D. ..	3 Nov. „	24 Oct. „	Staff.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
David Stuart Erskine Bain, M.D.	3 Nov. 1854	23 Jan. 1846	Staff.
William Hanbury	,, ,,	3 April 1845	33rd Foot.
Henry March Webb, M.D.	8 Dec. ,,	23 Sept. 1845	Staff.
Usher Williamson Evans, M.D.	,, ,,	3 April 1846	61st Foot.
Michael Fenton Manifold	,, ,,	22 May ,,	34th Foot.
Daniel Paterson Barry	,, ,,	7 Aug. ,,	1st Bat., Mil. Train.
Edward Wm. Young, M.D.	,, ,,	,, ,,	1st Bat., 60th Rifles.
Francis Reynolds	,, ,,	,, ,,	3rd Bat., Mil. Train.
Richard Gilborne	,, ,,	2 Oct. ,,	6th Dragoon Guards.
Alexander Smith, M.D.	12 Jan. 1855	7 Aug. 1846	47th Foot.
William Deeble	,, ,,	27 Oct. ,,	56th Foot.
Thomas Frederick Wall	,, ,,	20 Nov. ,,	2nd Dragoon Guards.
Henry Fowle Smith, M.D.	,, ,,	23 Mar. 1847	Staff.
Edwd. Wm. Bawtree, M.D.	19 ,, ,,	24 Nov. 1843	Staff.
Wellington Poole	9 Feb. ,,	1 Aug. 1845	54th Foot.
James Edwd. Scott, M.D.	,, ,,	11 June 1847	4th Bat., Rifle Brigade.
Thos. Connor O'Leary, M.B.	,, ,,	6 Aug. ,,	Royal Artillery.
John Sheldon Furlong, M.D.	,, ,,	19 Nov. ,,	6th Dragoons.
Thomas Crawford, M.D.	,, ,,	18 Feb. 1848	Staff.
Jenkin Homfray Llewelyn	,, ,,	17 Mar. ,,	8th Hussars.
V.C. Anthony Dickson Home C.B.	,, ,,	,, ,,	Staff,
Edwd. Wm. Thos. Mandeville	16 ,, ,,	25 Sept. 1846	2nd Bat., 7th Foot.
Dudley Hanley, M.D.	,, ,,	20 July 1847	Staff.
Thomas Fraser, M.D.	9 Mar. ,,	16 Dec. 1845	10th Hussars.
Edward Schaw Protheroe	16 ,, ,,	10 June ,,	Royal Artillery.
Stanhope Hunter Fasson, M.D.	23 ,, ,,	24 April 1846	Royal Artillery.
James Crerar	6 April ,,	3 Sept. 1847	106th Foot.
Robert Thornton	24 ,, ,,	6 July 1846	Staff.
Mathew Combe, M.D.	,, ,,	20 ,, ,,	Royal Artillery.
Henry Shearly Sanders	,, ,,	5 Mar. 1847	49th Foot.
James Leitch, M.D.	1 May ,,	23 Jan. 1846	41st Foot.
Charles Robert Robinson	,, ,,	12 Nov. 1847	83rd Foot.
Wm. Johnstone Fyffe, M.D.	,, ,,	27 Oct. 1848	Staff.
Jonas King Carr, M.D.	11 ,, ,,	24 July 1846	32nd Foot.
Patrick Joseph Clarke	,, ,,	17 Mar. 1848	84th Foot.
Andrew Acres Stoney	,, ,,	22 Dec. ,,	94th Foot.
Alexander McArthur, M.D.	,, ,,	,, ,,	2nd Bat., Mil. Train.
Philip Henry Eustace Cross	15 ,, ,,	,, ,,	58th Foot.
Edwd. Jas. Franklyn, M.D.	,, ,,	18 Sept. 1849	7th Dragoon Guards.
Henry Crisp, M.B.	22 June ,,	1 Oct. 1848	Staff.
Neil Henry Stewart, M.D.	,, ,,	,, ,,	98th Foot.
William Pearson Ward	26 ,, ,,	14 June 1847	Royal Artillery.
Alexander Mackay Macbeth	29 ,, ,,	21 July 1846	Staff.
John Coghlan Haverty	,, ,,	3 April 1849	52nd Foot.
George Smyth King, M.D.	29 June 1855	3 April 1849	96th Foot.
John Gorringe, M.D.	,, ,,	,, ,,	1st Bat., 4th Foot.
John Small	10 July ,,	30 Dec. 1845	2nd Bat., 13th Foot.
Henry Day Fowler	20 ,, ,,	19 ,, ,,	82nd Foot.
William Thomas Black	,, ,,	25 Sept. 1846	2nd Bat., 11th Foot.
John Rambaut, M.D.	,, ,,	29 Jan. 1847	Royal Canadian Rifles.
John And. Woolfreyes, M.D.	,, ,,	13 July ,,	Staff.
Charles Walter Poulton	,, ,,	8 June 1849	Staff.
Daniel John Doherty	,, ,,	28 Aug. ,,	1st Bat., 13th Foot.
William Perry	,, ,,	13 Sept. ,,	Royal Artillery.
James Fraser, M.D.	25 Sept. ,,	1 July 1848	50th Foot.
Andrew Leith Adams, M.D.	,, ,,	20 Oct. ,,	1st Bat., 22nd Foot.
John Riggs Miller Lewis, M.D.	7 Dec. ,,	11 Feb. 1848	Royal Artillery.
Thomas Park	21 ,, ,,	13 Sept. 1849	Royal Artillery.
Gavin Ainslie Turnbull	28 ,, ,,	15 Mar. 1850	Staff.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
John Duff, M.D.	8 Jan. 1856	11 May 1849	Royal Artillery.
John Coates, M.D.	25 „ „	16 Nov. 1849	26th Foot.
Henry Vereker Bindon, M.D.	25 May „	12 June 1846	Staff.
Richard Edward FitzGibbon	22 July „	10 Jan. 1851	60th Rifles.
Thomas Ligertwood, M.B.	20 Oct. „	20 Oct. „	4th Hussars.
John Hendley	5 Dec. „	14 Mar. „	1st Bat., 7th Foot.
Frederick Robinson, M.D.	20 Mar. 1857	19 Nov. 1847	1st Bat., Scots Fus. Gds.
Richard Domenichetti, M.D.	10 June „	3 April 1846	75th Foot.
Alexander Peile Cahill, M.D.	28 Aug. „	„ „	1st Bat., 6th Foot.
John James Clifford, M.D.	„ „	7 Aug. „	9th Lancers.
William Lapsley	„ „	„ „	Staff.
Thomas Esmonde White, M.D.	2 Oct. „	26 Sept. 1845	65th Foot.
Alex. G. Montgomery	„ „	9 Dec. „	46th Foot.
Henry Fredk. Robertson	„ „	19 Dec. „	Staff.
Brinsley Nicholson, M.D.	„ „	25 Sept. 1846	Staff.
John Madden	„ „	2 Oct. „	2nd Bat., 8th Foot.
James William Fleming	„ „	27 „ „	37th Foot.
Gordon Kenmure Hardie, M.D.	„ „	12 Feb. 1847	73rd Foot.
Henry Higgins Jones, M.D.	„ „	10 Dec. „	86th Foot.
James Lewis Holloway	„ „	17 Mar. 1848	Staff.
James Kellie, M.D.	„ „	5 May „	17th Lancers.
David Field Rennie, M.D.	„ „	19 July „	Staff.
Jas. Edwd. Clutterbuck, M.D.	„ „	22 Dec. „	42nd Foot.
Grahame Auchinleck, M.D.	„ „	„ „	81st Foot.
Frederick Douglas, M.D.	„ „	30 Mar. 1849	2nd Bat., 10th Foot.
Henry Martyn Fraser, M.D.	„ „	15 June „	2nd Bat., Rifle Brigade.
George Wm. Peake, M.D.	„ „	3 Aug. „	2nd Bat., 18th Foot.
Arthur Rudge	„ „	13 Sept. „	Royal Artillery.
Edward Touch, M.D.	„ „	25 „ „	Staff.
John Irvine, M.D.	„ „	16 Nov. „	Staff.
John Gibbons	3 Nov. „	22 Mar. 1850	95th Foot.
Richard Cooper Todd	„ „	19 April „	4th Bat., 60th Rifles.
Jones Lamprey, M.B.	„ „	7 June „	67th Foot.
V.C. Herbert Taylor Reade	„ „	9 Aug. „	Staff.
Robert McNab, M.D.	20 Jan. 1858	24 Sept. „	53rd Foot.
Robt. Beresford Smyth, M.D.	„ „	8 Oct. „	2nd Bat., 22nd Foot.
Daniel Macqueen, M.D.	„ „	5 Nov. „	44th Foot.
Howell Walters Voss	„ „	3 Jan. 1851	Royal Artillery.
James Carroll, M.D.	„ „	„ „	1st Bat., 9th Foot.
Dudley Clifton Wodsworth	„ „	10 „ „	70th Foot.
William Sim Murray, M.B.	„ „	„ „	66th Foot.
William Armstrong	„ „	„ „	Staff.
Thomas Carey	„ „	24 Jan. „	87th Foot.
Archibald Henry Fraser	„ „	21 Feb. „	88th Foot.
George Edwin Gains	„ „	„ „	2nd Bat., 6th Foot.
John Edward Moffatt	„ „	14 Mar. „	Staff.
Henry Bolton Hassard	„ „	„ „	1st Bat., 19th Foot.
Charles William Woodroffe	26 June „	21 „ „	2nd Bat., 1st Foot.
Benjamin Tydd	16 July „	25 April „	2nd Bat., 23rd Foot.
George Pain	30 „ „	8 May „	Royal Artillery.
William James Ingham	24 Aug. „	9 „ „	Staff.
Francis Holton, M.B.	„ „	14 „ „	77th Foot.
William Boyd	7 Sept. „	20 Feb. 1852	90th Foot.
Thomas Bassett Reid	5 Oct. „	16 May 1851	Staff.
Thomas Blatherwick	31 Dec. „	4 June 1847	Staff.
John Knox Leet	„ „	20 May 1851	Cape Mounted Rifles.
Wm. Arthur Thomson, M.B.	„ „	4 Sept. „	27th Foot.
George Paul Minchin Woodward, M.D.	„ „	12 „ „	2nd Bat., 20th Foot.
Alexander Scott Fogo, M.D.	„ „	7 Oct. „	Royal Artillery.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
Robert Thomas Buckle, M.D.	31 Dec 1858.	14 Oct. 1851	2nd Bat., 15th Foot.
C. M. M. Miller, M.D. ..	„ „	17 „ „	Staff.
Francis Cogan	„ „	18 Nov. „	2nd Foot.
Patrick McDermott, M.D. ..	„ „	25 „ „	Staff.
John Lyster Jameson ..	„ „	15 Dec. „	Staff.
Arthur Bell	„ „	2 Jan. 1852	36th Foot.
Thomas Llewellyn Nash, M.D.	18 Jan. 1859	14 Feb. 1852	Royal Artillery.
Theodore Gordon Bone, M.D.	„ „	17 „ „	Staff.
Donald Sinclair Smith ..	28 „ „	27 „ „	Staff.
Henry Bowles Franklin, M.D.	11 Mar. „	10 Mar. „	Royal Artillery.
John Phillips Cunningham, M.D.	„ „	13 April „	2nd Bat., 60th Rifles.
Thomas George FitzGerald..	8 April „	„ „	Staff.
John O'Nial	5 May „	„ „	51st Foot.
Duncan Robertson Rennie ..	18 Nov. „	27 „ „	31st Foot.
Cornelius Clark Rutherford..	2 Dec. „	7 May „	18th Hussars.
William Skeen, M.D. ..	13 „ „	8 Mar. 1855	Staff.
Patrick Andrew McDermott	16 „ „	27 Sept. „	Staff.
Frederick George Kerin ..	31 July 1860	1 July 1848	2nd Life Guards.
Thomas Clark Brady ..	11 Sept. „	9 May 1852	8th Foot.
John Smith Chartres ..	„ „	„ „	100th Regiment.
Benjamin Lane	„ „	3 July „	2nd Bat., 4th Foot.
Arthur Jackson Greer ..	„ „	„ „	1st Bat., 21st Foot.
Thomas William Fox, M.B.	18 „ „	5 „ „	Royal Engineers.
John Meane	21 „ „	5 Nov. „	Staff.
Thomas Knox Birnie ..	25 „ „	23 „ „	2nd Bat., 12th Foot.
Alexander Fisher Bartley ..	„ „	23 Dec. „	1st Bat., 12th Foot.
John Alex. McMunn, M.D...	16 Nov. „	1 Jan. 1853	Staff.
William Snell	15 Feb. 1861	6 May „	99th Foot.
Curtiss Martin	22 „ „	15 Feb. 1855	Staff.
Augustus Morphew	18 June „	18 Jan. 1856	Staff.
Charles O'Callaghan ..	6 Aug. „	15 Dec. 1854	Staff.
Watkin Sandom Whylock, M.D.	14 Jan. 1862	6 Nov. 1852	38th Foot.
Joseph Coleman Hornsby Wright, M.D.	„ „	8 „ „	Staff.
Robert Speedy	„ „	11 Mar. 1853	45th Foot.
James Nicholas Bell, M.D...	„ „	1 April „	2nd Bat., 5th Foot.
Johnston Ferguson	„ „	22 „ „	1st Bat., 15th Foot.
Wm. Alex. Mackinnon, C.B.	28 „ „	18 Feb. 1853	57th Foot.
William Tydd Harding ..	„ „	13 May 1853	2nd Bat., 19th Foot.
William Beale Wallis ..	„ „	27 „ „	Staff.
Digby William Lawlor ..	„ „	10 June „	1st Bat., 25th Foot.
Joshua Henry Porter ..	18 Feb. „	17 „ „	97th Foot.
Alexander Clark Ross, M.D.	16 May „	1 July „	92nd Foot.
John Bradshaw	10 June „	7 May 1858	Staff.
John Ogilvy, M.D.	8 July „	15 July 1853	Staff.
Augustus Frederick Turner..	„ „	26 „ „	43rd Foot.
William Stewart, M.D. ..	„ „	29 „ „	2nd Bat., 21st Foot.
Wm. Mackenzie Skues, M.D.	„ „	„ „	109th Foot.
George Calvert	18 „ „	1 Feb. 1859	Staff.
James Sinclair, M.D. ..	29 „ „	5 Aug. 1853	Staff.
William Sinclair, M.D. ..	„ „	2 Sept. „	1st Bat., 10th Foot.
Charles Vidler Cay	9 Jan. 1863	12 June 1846	Coldstream Guards.
Frederick Oakes	13 Feb. „	27 Feb. 1856	Staff.
James Arthur Hanbury, M.B.	20 „ „	30 Sept. 1853	63rd Foot.
Robert Fleetwood Andrews..	3 Mar. „	„ „	5th Lancers.
Owen W. George, M.D. ..	14 April „	6 June 1851	1st Life Guards.
William Alex. White, M.D.	5 May „	18 Oct. 1853	Royal Artillery.
Duncan A. C. Fraser, M.D...	„	28 „ „	103rd Foot.
Frederick Wm. Moore ..	„	„ „	Staff.

SURGEONS—*continued.*

NAME.	Date of Commission.	Date of Entry into the Service.	Service.
John Eldon Young, M.D.	12 May 1863	28 Oct. 1853	40th Foot.
Thomas Ravenscroft Whitty	12 ,, ,,	11 Nov. ,,	Staff.
John Coote Ovens	12 June ,,	16 ,, ,,	5th Dragoon Guards.
John Halyburton Ross, M.B.	28 Aug. ,,	,, ,,	39th Foot.
Thomas M. Bleckley	22 Sept. ,,	6 Jan. 1854	Staff.
Walter Moses Gibaut	,, ,,	3 Feb. ,,	Staff.
Robert Menzies	17 Nov. ,,	24 ,, ,,	4th Bat., Mil. Train.
Chamney Graves Irwin, M.B.	1 Dec. ,,	,, ,,	Staff.
Jas. Balfour Cockburn, M.D.	8 Jan. 1864	3 Mar. ,,	Royal Engineers.
Peter Davidson, M.D.	15 ,, ,,	5 Aug. 1853	Staff.
William Marshall Webb	,, ,,	24 Mar. 1854	Staff.
Thomas R. Williams, M.B.	,, ,,	,, ,,	28th Foot.
John Henry West, M.D.	16 Feb. ,,	,, ,,	Staff.
James Henry Lewis	8 Mar. ,,	,, ,,	1st Bat., 18th Foot.
John By Cole Reade	19 April ,,	,, ,,	Rifle Brigade.
Andrew Knox Drysdale	10 May ,,	,, ,,	Staff.
Benjamin Hinde	24 ,, ,,	22 Dec. 1859	Staff.
William Wilson Mills	28 June ,,	28 Mar. 1854	Staff.
Edward M. Sinclair, M.D.	,, ,,	,, ,,	Staff.
Charles J. White	,, ,,	,, ,,	74th Foot.
William Cattell	12 July ,,	,, ,,	Staff.
St. John Stanley	5 Aug. ,,	24 Feb. ,,	Staff.
Ormsby Bowen Miller	9 Sept. ,,	28 Mar. ,,	Military Train.
William A. Davidson, M.D.	,, ,,	,, ,,	Staff.
Lancelot Armstrong	11 Oct. ,,	7 April ,,	13th Hussars.
James Ekin, M.B.	18 ,, ,,	,, ,,	Staff.
Alfred Malpas Tippetts	,, ,,	,, ,,	Staff.
David Woods	28 ,, ,,	,, ,,	107th Foot.
James Hannan	4 Nov. ,,	,, ,,	Royal Artillery.
Thomas Clark	11 ,, ,,	,, ,,	Staff.
William Younge Jeeves	29 ,, ,,	,, ,,	2nd Bat., 25th Foot.
Frederick Tydd Abbott	30 Dec. ,,	,, ,,	2nd Bat., 24th Foot.
Francis Levison Gower Gunn	14 Mar. 1865	23 ,, 1858	Staff.

ASSISTANT-SURGEONS.

NAME.	Date of Commission.	Service.
Arthur Guy Elkington	11 Mar. 1853	2nd Bat., Scots Fus. Guards.
Constantine Caridi Read	13 May ,,	3rd Bat., Grenadier Guards.
Henry John H. Lawrence	24 Feb. 1854	1st Bat., Grenadier Guards.
Francis Bramley Baker	3 Mar. ,,	1st Bat., Scots Fus. Guards.
Alexander Maclean	7 April ,,	Royal Artillery.
Alexander Humfrey	,, ,,	Staff.
Edward Louis Lundy	,, ,,	Staff.
William Henry Pollard, B.A.	,, ,,	Royal Artillery.
Thomas Wright	21 ,, ,,	38th Foot.
Thomas John Murphy, M.A.	28 ,, ,,	Staff.
Peter Nevill Jackson	,, ,,	1st Bat., 13th Foot.
Francis S. Bennet-Francois de Chaumont, M.D.	,, ,,	Staff.
Alexander Guthrie, M.D.	,, ,,	3rd Bat., Rifle Brigade.
Edward Young Kellett	,, ,,	Staff.
Robert Augustus Chapple	,, ,,	Royal Artillery.
Charles Ricketts	,, ,,	Royal Artillery.
Lucas George Hooper	,, ,,	10th Hussars.
Adam Graham Young	5 May ,,	2nd Bat., 60th Rifles.
Robert Atkinson	,, ,,	Staff.

ASSISTANT-SURGEONS—*continued.*

Name.	Date of Commission.	Service.
Charles Carroll Dempster	5 May 1854	Staff.
John Joseph Mulock	„ „	1st Dragoons.
Samuel Joseph Bayfield	„ „	Staff.
Stephen Massett Webb, M.D.	19 „ „	86th Foot.
Allen Bryson, M.D.	„ „	Staff.
Henry Turner	„ „	2nd Bat., Scots Fus. Guards.
Robert Wyatt Meadows	26 „ „	Canadian Rifles.
Alexander Reid	„ „	Staff.
Robert William Jackson	„ „	86th Foot.
Robert Watson	„ „	4th Bat., Military Train.
Richard Hungerford	„ „	Staff.
Alexander Robert Hudson, M.B.	„ „	1st Bat., 6th Foot.
William Menzies Calder	„ „	Royal Artillery.
William Henry Price	„ „	89th Foot.
William Jasper Rendell	„ „	55th Foot.
Thomas McSheehy, M.D.	„ „	1st Bat., 7th Foot.
Henry Titterton, M.D.	„ „	Staff.
Duncan C. Taylor, M.D.	„ „	Staff.
Leonard Kidd, M.B.	„ „	27th Foot.
John William Trotter	„ „	2nd Bat., Coldstream Guards.
Edward Thiselton	7 June „	Staff.
Leslie Ogilby Patterson	„ „	Canadian Rifles.
John Tulloch	„ „	Staff.
Wallace Haward	„ „	21st Hussars.
George Floyer Bankes Arden	9 „ „	1st Bat., 12th Foot.
George Bell Popplewell	„ „	Staff.
William Grantt, M.B.	„ „	31st Foot.
Samuel Stacy Skipton, M.D.	„ „	78th Foot.
James Petrie Street, M.D.	„ „	Staff.
Thomas Tarrant	16 „ „	Royal Artillery.
Alfred Hooper	„ „	42nd Foot.
Exham Long Hiffernan	„ „	1st Bat., 5th Foot.
Edmund Humphrey Roberts	23 „ „	Staff.
James Hornidge Finnemore	„ „	Royal Artillery.
George Allan Hutton	„ „	60th Foot.
Alexander Dudgeon Gulland	„ „	Royal Artillery.
Thomas Teevan	30 „ „	1st Bat., 3rd Foot.
John Sparrow	„ „	Staff.
William Hemphill, M.D.	14 July „	Staff.
Richard C. Lofthouse, M.D.	„ „	14th Dragoons.
Joseph John Thompson	„ „	Ceylon Rifles.
Daniel O'Donovan, M.D.	„ „	Staff.
Joseph Barker	15 „ „	Royal Artillery.
Henry Clifford	„ „	Royal Artillery.
Hamilton Mitchell	21 „ „	96th Foot.
Rowland Winburn Carter	28 „ „	82nd Foot.
Richard Wolseley	„ „	Staff.
Ralph Robert Scott	„ „	Staff.
Francis Odell	„ „	Staff.
William Ramsay Stewart	11 Aug. „	Royal Artillery.
John Crown Agnis	„ „	Royal Horse Guards.
Charles James Davenport, M.D.	15 „ „	6th Dragoon Guards.
Jos. Fletcher Lougheed	„ „	Staff.
Francis Collins, M.D.	1 Sept. „	Royal Military College.
John Low Erskine, M.D.	„ „	Royal Engineers.
William Thomas Paliologus	„ „	Staff.
David Cullen, M.D.	„ „	3rd Dragoon Guards.
Richard William Meade	„ „	Staff.
William Ferguson	22 „ „	Royal Engineers.
Michael James Griffin	„ „	3rd Dragoon Guards.
William Macnamara	6 Oct. „	4th Dragoon Guards.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.
George Henry Finlay	6 Oct. 1854	Staff.
John Vernon Seddall, M.D.	13 „ „	Royal Engineers.
John Carleton Clery	„ „	Royal Artillery.
John Henry Hearn	„ „	Royal Artillery.
Joseph Johnston, M.D.	27 „ „	26th Foot.
Arthur E. T. Longhurst, M.D.	„ „	Staff.
Augustus P. M. Corbett, M.D.	„ „	Royal Artillery.
George Richard Woolhouse	29 „ „	19th Hussars.
Sydney Alder	3 Nov. „	Staff.
James Crosse Johnston	„ „	Royal Artillery.
Tertius Ball, M.D.	„ „	36th Foot.
Thomas Smith Hollingsworth	„ „	Royal Engineers.
John Martin Hyde	„ „	84th Foot.
Jeffry Allen Marston, M.D	10 „ „	Royal Artillery.
Andrew Semple, M.D.	„ „	Staff.
Walter Leach	24 „ „	Staff.
Oliver Barnett	„ „	12th Lancers.
William Henry Yates	„ „	Royal Artillery.
Francis Henry Macfadin	1 Dec. „	1st Bat., 11th Foot.
William Fleming Cullen	„ „	Staff.
William Carden Roc	„ „	Staff.
George Monlas Slaughter	13 „ „	Staff.
James McNeill Beatty	14 „ „	98th Foot.
John Wild Hulseberg	„ „	Royal Artillery.
V.C. T. E. Hale, M.D., B.A.	„ „	1st Bat., 7th Foot.
Charles Dodgson Madden	„ „	Royal Artillery.
Sampson Roch	„ „	Royal Artillery.
William Henry Corbett, M.D.	15 „ „	6th Dragoons.
Randolph Webb	„ „	Royal Artillery.
James Jardine, M.D.	„ „	Royal Artillery.
Henry Sherlock	„ „	Staff.
William Ramsay, M.D.	„ „	Staff.
Stephen Henry Dickerson	23 „ „	Royal Artillery.
George McGusty Carolan	„ „	Staff.
Herbert Chalmers Miles	„ „	Royal Artillery.
William Ralph Lane	29 „ „	2nd Bat., Grenadier Guards.
Henry Lloyd Randell	5 Jan. 1855	Royal Artillery.
John George Faught	„ „	Royal Artillery.
Clement Williams	„ „	68th Foot.
Edward McGill, M.D.	8 „ „	7th Dragoon Guards.
John Michael	10 „ „	Staff.
John Wood	„ „	Staff.
Thomas Jerram Orton	17 „ „	Royal Artillery.
Patrick Kilgour	„ „	Staff.
William Henry Muschamp	23 „ „	11th Hussars.
Alfred Jos. Lumby Hepworth	26 „ „	Royal Artillery.
George Perry	29 „ „	1st Bat., Scots Fus. Guards.
Edwin James Hopwood	„ „	Royal Artillery.
Stewart Aaron Lithgow	3 Feb. „	3rd Dragoon Guards.
Emil Becher, M.D.	13 „ „	104th Regiment.
Morgan Jones Jones	15 „ „	Staff.
V.C. William Geo. Nicholas Manley	20 „ „	Royal Artillery.
Andrew Robertson Smith	21 „ „	Royal Artillery.
Thomas Stawell Barry	22 „ „	Staff.
Robert Henry Beale	„ „	53rd Foot.
Frederick Mackenzie Skues	28 „ „	Staff.
Henry Joseph Rose	6 Mar. „	1st Bat., 2nd Foot.
William Henry Harris	10 „ „	32nd Foot.
Charles Alex. Innes, M.D.	14 „ „	16th Lancers.
John Copeland Knipe	„ „	Staff.
Charles John Kirwan	20 „ „	Staff.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.
John Noble Shipton	23 Mar. 1855	2nd Dragoon Guards.
V.C. V. M. McMaster, M.D.	27 „ „	18th Hussars.
Alfred Hoyte	„ „	61st Foot.
Thomas Kennedy	30 „ „	Staff.
Nathaniel Norris	2 April „	41st Foot.
James Robert Crawford	„ „	Staff.
John Whittle Rimmer	„ „	Royal Artillery.
Joseph Watts	5 „ „	1st Dragoon Guards.
George Thomas Bourke	8 „ „	51st Foot.
David Stranaghan, M.D.	„ „	Staff.
Alexander Robert Kilroy	12 „ „	Royal Artillery.
Bradford Stiles	14 „ „	40th Foot.
Charles Moore Jessop	17 „ „	6th Dragoons.
Robert Turner	„ „	Staff.
William Robert Burkitt	„ „	74th Foot.
John Harrison Robotham	23 „ „	7th Dragoon Guards.
William Langford Farmer	24 „ „	29th Foot.
Andrew Knox Rickards	„ „	Royal Artillery.
William Fletcher	4 May „	Royal Artillery.
John Denis Healy	5 „ „	1st Bat., 15th Foot.
William Henry Leslie, M.D.	7 „ „	Royal Artillery.
John Folliott	„ „	51st Foot.
George Langford Hinde	15 „ „	Staff.
Jno. Henry Gouldsbury Meares	16 „ „	Royal Engineers.
Richard Uniacke Cashman, M.D.	18 „ „	Royal Artillery.
Edwin Wilson	19 „ „	4th Dragoons.
Alex. Crawford Robertson	1 June „	Royal Artillery.
William Sharpe	6 July „	Staff.
James Alfred Turner	7 „ „	Royal Artillery.
James Kelly	17 „ „	Royal Artillery.
Thomas John Tucker	18 „ „	2nd Bat., 10th Foot.
Samuel Fuller	23 „ „	19th Hussars.
Hector Ferguson	30 „ „	Staff.
Samuel Black Roe, M.B.	4 Aug. „	92nd Foot.
Francis John Shortt	6 „ „	Staff.
Henry Richard Lobb Veale, M.D.	14 „ „	Royal Artillery.
James Greig Leisk, M.B.	28 „ „	94th Foot.
Henry Alexander Gogarty	29 „ „	52nd Foot.
Henry Kelsall	8 Sept. „	1st Bat., 20th Foot.
Charles Christopher Piper	12 „ „	2nd Bat., 9th Foot.
William Collis	14 „ „	Royal Artillery.
Thomas Norton Hoysted	28 „ „	Staff.
Thos. Butler Power O'Brien	29 „ „	Staff.
Nicholas Ffolliott	13 Oct. „	20th Hussars.
Edmund Greswold McDowell	6 Nov. „	Staff.
Benjamin Cowan Kerr	17 „ „	2nd Bat., 6th Foot.
Yorke Hobart Johnson	20 „ „	Royal Artillery.
John Goodwin	5 Dec. „	Staff.
James Bonnyman, M.B.	13 „ „	89th Foot.
Ebenezer John Hatchell	15 Jan. 1856	Staff.
John James Henry	18 „ „	Staff.
John Mundy	4 Feb. „	21st Hussars.
Eugene Francis O'Leary	9 „ „	Royal Artillery.
Samuel Pratt Woodfull	„ „	Royal Artillery.
William O'Halloran	18 „ „	Royal Artillery.
Julius Wiles	11 April „	Rifle Brigade.
Maximilian Grant, M.D.	10 Mar. 1857	2nd Life Guards.
George Palatiano, M.D.	8 April „	Staff.
Alex. Frederick Bradshaw	27 May „	Royal Artillery.
Edward Louis McSheehy, M.D.	„ „	5th Dragoon Guards.
James Parr	28 „ „	3rd Dragoons.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.		Service.
James Bowyer Baker	28 May	1857	Staff.
Thomas Allen Thornhill, M.B.	„	„	7th Dragoons.
Robert Arthur Elliott	30 „	„	95th Foot.
Thomas Rawlings Mould	31 „	„	Royal Artillery.
John Wallace	2 June	„	94th Foot.
Robert Lewer	1 Aug.	„	Royal Artillery.
Edmund McGrath	„	„	8th Hussars.
Arthur Chester	„	„	Royal Artillery.
Charles Henry Browne	„	„	15th Hussars.
Thomas Rudd, M.D.	„	„	2nd Dragoons.
Thomas Sharkey	„	„	Royal Artillery.
Frederick Ffolliott	„	„	Royal Artillery.
George Samuel Burnside	„	„	51st Foot.
Alexander S. Russell, M.D.	„	„	Royal Artillery.
Richard Armstrong Hyde	17 „	„	Staff.
Edward Joseph Crane	18 „	„	Staff.
William Samuel Chapman	15 Sept.	„	87th Foot.
Philip Broke Smith, M.D.	„	„	87th Foot.
David Chambers McFall	„	„	34th Foot.
James Landale, M.D.	„	„	6th Dragoon Guards.
William Silver Oliver, M.D.	„	„	4th Bat., 60th Rifles.
Alexander Watt Beveridge, M.D.	„	„	Royal Artillery.
John Henry Beath, M.D.	„	„	Staff.
William Ashton, M.B.	„	„	Royal Artillery.
George Whitla	„	„	Royal Artillery.
Robert Heard, M.D.	„	„	67th Foot.
Alexander Neill	„	„	65th Foot.
Eugene McShane	„	„	Staff.
James Marmaduke Taylor	„	„	Royal Artillery.
Joseph Richard Kehoe	„	„	2nd Bat., 16th Foot.
Henry Carden Herbert	„	„	85th Foot.
Edward L'Estrange, M.D.	„	„	Cape Mounted Rifles.
Robert Owen Hayden	„	„	3rd Bat., 60th Rifles.
Robert Walter Clifton	28 „	„	Royal Artillery.
Decimus F. de Hodgson, M.D.	„	„	Royal Artillery.
Frederick William Wade	„	„	3rd Bat., 60th Rifles.
Charles Mackinnon	„	„	20th Hussars.
Augustus Oliver Applin	3 Oct.	„	68th Foot.
James Good	„	„	Staff.
John Henderson Whittaker	„	„	69th Foot.
Henry Foljambe Paterson	19 „	„	Royal Artillery.
Robert David Burn, M.D.	„	„	Royal Artillery.
Melville George Jones	„	„	Royal Artillery.
Robert Sutherland	„	„	5th Dragoons.
Francis Madden	„	„	69th Foot.
James Inkson, M.D.	„	„	80th Foot.
John Gordon Grant	„	„	48th Foot.
Daniel Murray, M.D.	„	„	Staff.
Walter John	9 Nov.	„	Staff.
James Jameson, M.D.	„	„	47th Foot.
John Warren	„	„	59th Foot.
William Tanner	„	„	Royal Artillery
Henry Cole Peppin	„	„	Staff.
George Bouchier	„	„	Royal Artillery.
Chas. Bartholomew Mathew	„	„	Staff.
James Doran, M.D.	„	„	Staff.
Byng Thomas Giraud, M.D.	„	„	Staff.
James Whinyates George Allen	12 Nov.	„	99th Foot.
Edward Brock	8 Dec.	„	1st Foot.
William Sly	„	„	Royal Artillery.
John T. M. Symons, M.D.	„	„	Royal Artillery.

ASSISTANT-SURGEONS—*continued*.

NAME.	Date of Commission.	Service.
Michael Quinlan	8 Dec. 1857	Staff.
Robert Thomas Scott	„ „	11th Foot.
William Gerard Don, M.D.	22 Jan. 1858	28th Foot.
William Cathcart Boyd	„ „	Royal Artillery.
John Sarsfield Comyn	„ „	Royal Artillery.
James McCrevey, M.D.	„ „	66th Foot.
Charles Henry Leet	„ „	Staff.
Edward Barrett Kearney	„ „	Staff.
William Hillman	„ „	Royal Artillery.
Ebenezer Miller, M.D.	„ „	2nd Bat., 4th Foot.
William Jay	„ „	Staff.
Alexander Macintyre, M.D.	„ „	2nd Bat., 11th Foot.
Nicholas Loftus Gray	„ „	2nd Bat., 13th Foot.
Thomas Bennett	„ „	2nd Bat., 14th Foot.
Richard W. Saunders, M.D.,	„ „	1st Bat., 16th Foot.
Edward Coffey	„ „	2nd Bat., 15th Foot.
James Mackay, M.D.	18 Feb. „	Royal Artillery.
Wm. Henry Pickford, M.B.	19 „ „	2nd Bat., Grenadier Guards.
Walter B. Ramsbotham, M.B	10 Mar. „	Royal Artillery.
Donald Macpherson	„ „	2nd Bat., 19th Foot.
Edward Hardinge	„ „	Royal Artillery.
William Curran	„ „	88th Foot.
James Hinton	„ „	Staff.
John Anderson, M.B.	„ „	Staff.
James Davis	„ „	57th Foot.
John Henry Hunt	„ „	Rifle Brigade.
Isaac Hoysted	„ „	1st Bat., 8th Foot.
Charles Hervé Giraud	„ „	Staff.
John Atkinson	„ „	5th Dragoons.
Hugh Deane Massy	„ „	Staff.
Francis Henry Preston	„ „	Staff.
George Ralph Tate, M.D.	17 „ „	Royal Artillery.
Robert Spence	24 „ „	Staff.
John Collins, M.D.	„ „	Staff.
William Isaac Spencer	22 April „	2nd Bat., 18th Foot.
Henry Knaggs	„ „	Staff.
Richard William Berkeley	„ „	Royal Artillery.
Charles Gray	„ „	Royal Artillery.
John Carlaw	„ „	58th Foot.
Frederick Pennington	„ „	Staff.
James Thompson	„ „	Staff.
James d'Altera	„ „	Royal Artillery.
Hampden Healey Maclean	„ „	Royal Artillery.
James Paxton, M.D	„ „	30th Foot.
Edward Hopkins	„ „	71st Foot.
Merrick Lloyd Burrows	30 „ „	Staff.
FitzGerald Edward Scanlan	„ „	1st Bat., 10th Foot.
Albert Stan. Knight Prescott	6 May „	Royal Artillery.
Arthur Croker	7 „ „	Staff.
Joseph Salkeld Johnston, M.D.	„ „	Staff.
Thomas Turville Gardner	„ „	90th Foot.
Andrew Moffitt	25 „ „	Staff.
John Colahan, M.D.	„ „	2nd Bat., 24th Foot.
Richard John Wm. Orton	„ „	76th Foot.
Charles Rattray, M.D.	„ „	Staff.
Joseph Bourke	„ „	Royal Artillery.
Thomas Walsh	„ „	2nd Bat., 21st Foot.
Peter Frederick Newland	„ „	Staff.
John Alexander Lamb	22 June „	54th Foot.
William White	„ „	2nd Bat., 1st Foot.
Richard Beresford Carson, M.B.	„ „	Staff.

ASSISTANT-SURGEONS—*continued*.

NAME.	Date of Commission.	Service.
William Laugworthy Baker	22 June 1858	Staff.
Henry William Devlin	„ „	Royal Artillery.
Hugh Mackay Macbeth	„ „	Staff.
Thomas Michael O'Brien	„ „	Royal Artillery.
Horatio Scott	„ „	Staff.
John Henry Halhed Tothill	„ „	17th Foot.
George Alex. Moorhead	22 July „	Royal Artillery.
Joseph Edward O'Loughlin	5 Aug. „	63rd Foot.
James Henry Jeffcoat	„ „	1st Bat., 9th Foot.
Francis Roberts Hogg, M.D.	„ „	Royal Artillery.
John Mackenzie, M.D.	„ „	62nd Foot.
John Davidge	„ „	Royal Artillery.
John Kinahan	„ „	Royal Artillery.
James George Stewart Mathison	„ „	Staff.
Samuel Archer	„ „	98th Foot.
James Wilson, M.B.	„ „	2nd Bat., 3rd Foot.
Walter Crisp	„ „	Staff.
Edward Acton Gibbon	1 Sept. „	Staff.
Robert Cardiff Crean	„ „	Royal Artillery.
Robert Gillespie, M.D.	„ „	Staff.
Austin Jonas Ferguson	„ „	Staff.
John Robinson	22 „ „	Royal Artillery.
St. John Killery	„ „	Staff.
Edward O'Connell	„ „	Staff.
Lancelot Andrews White	„ „	Ceylon Rifles.
Edmond Hoile, M.D.	„ „	11th Foot.
Thomas Alex. C. Macarthur	„ „	Royal Artillery.
William Alex. Gardiner	„ „	Staff.
Mathew Lawrence White	„ „	Royal Artillery.
William Graves	„ „	Royal Artillery.
Tobias Barnwell	„ „	Rifle Brigade.
William Venour	„ „	46th Foot.
Charles Benjamin Mosse	8 Oct. „	Staff.
Langer Carey, M.D.	13 „ „	Royal Artillery
John Stuart	„ „	Staff.
Joseph Vavasour Lane	„ „	2nd Bat., 4th Foot.
George Forbes Adams	„ „	Staff.
Alexander Richmond	„ „	Royal Artillery.
Thomas Walsh	„ „	12th Foot.
Francis Alfred Turton	„ „	Royal Artillery.
George Scott Davie, M.D.	1 Nov. „	Staff.
John Montgomery Fiddes, M.D.	„ „	Royal Artillery.
Francis Edward McFarland	„ „	Royal Artillery.
Thomas Ramsay	„ „	Staff.
V.C. William Temple, M.B.	„ „	Royal Artillery.
Wm. Kippen Stewart, M.D.	„ „	Staff.
Patrick Barret Kearney	„ „	Staff.
Henry Harrison	16 „ „	Royal Artillery.
James Martin	„ „	Staff.
William Everet	„ „	39th Foot.
James Winterscale Lougheed	„ „	56th Foot.
Andrew Thomas Carbery	„ „	Staff.
Robert Austen Allen	23 „ „	71st Foot.
Benjamin Burland, M.B.	1 Dec. „	Royal Artillery.
Alfred Lewer	„ „	Royal Artillery.
Thomas Hession	„ „	70th Foot.
Edwin Wilkes	„ „	Royal Artillery.
George Edward Gascoyen	„ „	Staff.
William Robert Kerans	14 „ „	11th Foot.
Edward Litton Low, M.B.	„ „	Staff.
Robert Lindsay, M.B.	„ „	Staff.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.
Thomas Murtagh	14 Dec. 1858	Staff.
John Greig, M.B.	„ „	Royal Artillery.
George Park, M.D.	„ „	52nd Foot.
James Shand Duncan, M.D.	„ „	81st Foot.
Richard Henry	„ „	Royal Artillery.
Robert Muir Gilchrist, M.D.	„ „	Staff.
Edmund Thomas Palmer	12 Jan. 1859	Royal Artillery.
Charles William Griffith	„ „	Royal Artillery.
Alexander Allan, M.D.	„ „	2nd Bat., 17th Foot.
Robert Farquharson, M.D.	„ „	2nd Bat., Coldstream Gds.
Hunt Johnson Bailey	„ „	58th Foot.
Henry Walker	„ „	19th Foot.
William Hensman	„ „	20th Foot.
Charles Edmund Wikeley	„ „	1st Bat., 19th Foot.
Arthur Sanderson	„ „	Staff.
William Armstrong	„ „	25th Foot.
Alex. Campbell McTavish	„ „	3rd Bat., 60th Rifles.
Thomas Seward, M.D.	1 Feb. „	Staff.
James Watson	„ „	Staff.
James Edward Clark	„ „	2nd Bat., 22nd Foot.
James Dow Sainter	1 Mar. „	Royal Artillery.
Edwin Granville Ley, M.D.	„ „	Staff.
Edward Corrigan Markey	„ „	2nd Bat., 25th Foot.
William Millar	„ „	Royal Artillery.
Hunter Alexander Coghlan	„ „	1st Bat., 18th Foot.
King John Parr	„ „	Royal Artillery.
William Orr	„ „	1st Bat., 18th Foot.
Edward Parsonage, M.D.	„ „	64th Foot.
Joseph William Carter Neynoe Murphy	„ „	75th Foot.
Geo. Carson Gribbon, M.B.	20 April „	25th Foot.
George Cardell	„ „	Staff.
James Land, M.D.	„ „	21st Foot.
Morgan Stanislaus Grace, M.D.	„ „	Staff.
Charles Edward Smith, M.D.	„ „	Staff.
Alexander Jennings, M.D.	„ „	Staff.
Charles Wyat Watling	„ „	Staff.
Maurice Tracey	„ „	Staff.
George Simon	„ „	Royal Artillery.
Florence Theobald McCarthy	„ „	1st Bat., 23rd Foot.
Robert Tate, M.D.	„ „	Staff.
Sidney Keyworth Ray	„ „	Staff.
George Abraham Davidge	„ „	Staff.
Valentine Maher	„ „	Staff.
Alexander Edward Bartlet	„ „	Royal Artillery.
Robert Storey	„ „	Royal Artillery.
John Adsetts	13 June „	Royal Artillery.
Edward Harford Lloyd, M.B.	„ „	Staff.
James Young Donaldson	„ „	100th Regiment.
Oliver Codrington	„ „	Staff.
Edwin Drew	„ „	Royal Artillery.
John Adcock, M.D.	„ „	Staff.
Howison Y. Howison, M.D.	„ „	Staff.
George Frederick Spry	„ „	9th Lancers.
John Thomas Milburn	„ „	Staff.
John Alfred Illingworth	„ „	Royal Artillery.
Robert Alex. Peter Grant	„ „	43rd Foot.
Arthur Herbert Orpen	„ „	Staff.
Alexander Thomson, M.D.	„ „	Staff.
James A. B. Horton, M.D.	5 Sept. „	Staff.
Wm. Brough. Davies, M.D.	„ „	Staff.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.
Arthur Bowen Richards Myers	25 Sept. 1859	1st Bat., Coldstream Guards.
James Tulloch Tulloch, M.D.	11 Oct. ,,	42nd Foot.
Arthur Charles Gaye	,, ,,	Royal Artillery.
Wm. Evelyn Alston, M.D.	,, ,,	Staff.
Joseph Sumpner Joyner	,, ,,	Royal Artillery.
John Alexander Scott	,, ,,	91st Foot.
Arnold Royle	,, ,,	Royal Artillery.
Thomas Wood, M.D.	,, ,,	45th Foot.
James Bell Jardine	,, ,,	Royal Artillery.
John E. Stewart, M.D.	,, ,,	Staff.
Henry Cramer Guinness	,, ,,	Royal Artillery.
Alexander Oswald Cowan, M.D.	,, ,,	Royal Artillery.
William Creagh	15 ,, ,,	Royal Artillery.
Francis Falwasser	19 Jan. 1860	Staff.
Robert Waters, M.D.	,, ,,	Staff.
John Butler Hamilton, M.B.	,, ,,	Royal Artillery.
Edward Denham Tomlinson	,, ,,	Staff.
John James Chappell, M.D.	,, ,,	48th Foot.
Matthew Jas. E. Fagan, M.D.	,, ,,	46th Foot.
William Cherry	,, ,,	1st Bat., 14th Foot.
Samuel Edward Maunsell	,, ,,	97th Foot.
William Traill, M.D.	,, ,,	91st Foot.
Nicholas Avent	,, ,,	66th Foot.
William Christy Robinson	,, ,,	34th Foot.
John Wales	,, ,,	Staff.
James Robert Gaussen, M.B.	,, ,,	Staff.
John Livingston Power	,, ,,	97th Foot.
Patrick Walter Stafford	,, ,,	56th Foot.
Thomas Henry White, M.D.	,, ,,	Royal Artillery.
Thomas Quinlan	,, ,,	Staff.
Owen Owen	,, ,,	50th Foot.
James Ferguson	,, ,,	Staff.
Edward James Boulton	,, ,,	Staff.
George Elmsley Will	,, ,,	Staff.
John Richard Thomas	17 July ,,	Staff.
Chas. Henry Young Godwin	1 Oct. ,,	Royal Artillery.
Franklin Gillespie, M.D.	,, ,,	Staff.
Albert Augustus Gore, M.D.	,, ,,	Staff.
Thomas Maunsell	,, ,,	48th Foot.
George Farr White	,, ,,	77th Foot.
Frederick Robert Wilson, M.B.	,, ,,	1 Bat., 20th Foot.
Nathaniel Alcock	,, ,,	35th Foot.
Donald M. Davidson, M.D.	,, ,,	35th Foot.
Robert Edward Heath, M.D.	,, ,,	88th Foot.
Robert Adams, M.D.	,, ,,	81st Foot.
Reginald Croft Lever, M.B.	,, ,,	7th Hussars.
Bronislaw J. Jazdowski, M.B.	,, ,,	93rd Foot.
James Thompson	,, ,,	Staff.
Caleb Sherar Wills	,, ,,	83rd Foot.
Robert De Burgh Riordan	,, ,,	38th Foot.
Thomas Young Baker	,, ,,	27th Foot.
John Henry N. Bracken	,, ,,	Royal Artillery.
Patrick Quinlan	,, ,,	Staff.
Frank Pout	,, ,,	Staff.
Patrick Charles Baxter, M.B.	,, ,,	93rd Foot.
Samuel Gamble White, M.D.	,, ,,	Staff.
Henry Lamb	,, ,,	Staff.
Henry Offley Harvey	,, ,,	1st Bat., 21st Foot.
Erskine Burnett Grant, M.D.	,, ,,	Staff.
William Robert Wall	,, ,,	Royal Artillery.
Charles Hamilton Harvey	1 Mar. 1861	Staff.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.
Alexander Long	1 Mar. 1861	Staff.
Augustus Fred. Elliot, M.D... ..	„ „	Staff.
John Waring Belcher, M.D... ..	1 April „	Royal Artillery.
Francis Henry Welch	„ „	22nd Foot.
Robert Batho	„ „	Staff.
William Ironside, M.D.	„ „	Royal Artillery.
Francis Patrick Staples	„ „	19th Foot.
Joseph John Pope	„ „	Royal Artillery.
Joseph Augustin Fitzpatrick ..	„ „	1st Dragoon Guards.
William Hill Climo, M.D.	„ „	Rifle Brigade.
Wm. James Wilson, M D.	„ „	Staff.
Usher Beere Eaton, M D.	„ „	Staff.
Walter Nethercoat Pell	„ „	Rifle Brigade.
Alfred F. Stafford Clarke, M.D. ..	„ „	Royal Artillery.
Augustus Robinson Hall	„ „	Royal Artillery.
James Watt, M.D.	„ „	Royal Artillery.
Edward Footner..	„ „	72nd Foot.
John Ross Murray, M.D.	15 June „	107th Foot.
Frank Simpson	1 Aug. „	Staff.
Edward McCarthy	20 Mar. 1862	Staff.
Thomas Parker Smith, M.B. ..	31 „ „	104th Foot.
John Dustan	„ „	107th Foot.
Acheson George Bartley, M.D. ..	„ „	101st Foot.
Henry Frank Hensman	„ „	77th Foot.
William James Tyrrell	„ „	102nd Foot.
John Barlow Hannah, M.D. ..	„ „	101st Foot.
Thomas Cecil Morgan	„ „	105th Foot.
Richard Patrick Ferguson	„ „	Royal Artillery.
Thomas Dodd Milburn	„ „	108th Foot.
Alex. Ferrier Churchill, M.D. ..	„ „	109th Foot.
John Stannard McAdam	„ „	Royal Artillery.
Edward Nicholson	„ „	Royal Artillery.
Richard Jones Owen, M.D.	„ „	Royal Artillery.
Samuel Rowe	16 April „	Staff.
Alfred John Belemore	„ „	Staff.
Allan Nesbitt Fox	„ „	Staff.
Wm. Nelson Duggan, M.D... ..	27 May „	Staff.
Joseph Gray	28 Aug. „	Staff.
David Mackie, M.D...	1 Oct. „	2nd Bat., 7th Foot.
William George Ross, M.D... ..	„ „	2nd Bat., 8th Foot.
Richard William Hare, M.B. ..	„ „	80th Foot.
Charles S. Close	„ „	2nd Bat., 5th Foot.
Wilmot H. T. Power..	„ „	Staff.
George Nicol Irvine, M.D.	„ „	Royal Artillery.
William H. B. Clapp, M.D... ..	„ „	Staff.
John Mangin Waters	„ „	82nd Foot.
Campbell M. Douglas, M.D... ..	„ „	1st Bat., 24th Foot.
Baynes Reed	„ „	12th Foot.
Frederick H. Dunbar, M.D... ..	„ „	Staff.
John Edward Fannin	„ „	103rd Foot.
John Hamer Oliver	„ „	Royal Artillery.
Stephen Flood, M.B...	„ „	106th Foot.
Charles A. Maunsell, M.D.	„ „	Royal Artillery.
Nicol Carter	„ „	109th Foot.
Jos. L. Curtis	„ „	Staff.
W. Folliott	„ „	106th Foot.
Kenneth W. Cumming, M.D. ..	„ „	Royal Artillery.
Richard Hall, M.D.	„ „	33rd Foot.
Jos. Rutherford, M.B.	„ „	Royal Artillery.
Frederick B. Scott, M.D.	„ „	18th Hussars.
Ignatius McD. O'Farrell	„ „	108th Foot.

ASSISTANT-SURGEONS—*continued*.

NAME.	Date of Commission.	Service.
John Langdon	1 Oct. 1863	105th Foot.
Gough Ashton, M.B.	„ „	102nd Foot.
Edward Chandler	14 April „	Staff.
Wm. Creyk, M.B.	„ „	Staff.
Edgcombe Venning	„ „	1st Life Guards.
Alexander Brebner, M.B.	„ „	55th Foot.
William Nash, M.D.	„ „	Staff.
William E. Dudley	„ „	76th Foot.
Alexander Doig	„ „	79th Foot.
Henry Art. Martin, M.D.	„ „	Staff.
W. West Quinton, M.B.	„ „	Royal Artillery.
George W. McNalty, M.D.	„ „	Staff.
William T. Martin, M.D.	„ „	45th Foot.
John N. Davis	„ „	44th Foot.
William J. Page	„ „	Staff.
Frederick Ferguson, M.D.	„ „	Staff.
Richard G. Segrave	„ „	Staff.
John W. Heather	24 Sept. „	Staff.
A. A. Stewart, M.D.	„ „	Staff.
Robert William Troup, M.B.	30 „ „	54th Foot.
William Raymond Kynsey	„ „	Staff
Robert William Lawless	„ „	23rd Foot.
James Forbes Beattie, M.D.	„ „	79th Foot.
Robert Jas. Blair Cunynghame, M.D.	„ „	Staff.
Alexander Thomson, M.D.	„ „	Staff.
Alexander Turner, M.D.	„ „	Staff.
Alexander Francis Preston, M.B.	„ „	Staff.
Richard Wm. Forsayeth	„ „	95th Foot.
John P. De G. Delmege, M.D.	„ „	Staff.
Charles McD. Cuffe	„ „	Staff.
Valesius S. Gouldsbury	„ „	Staff.
John Alexander Shaw, M.D.	„ „	4th Foot.
Charles Haines	„ „	Staff.
Forbes Dick, M.D.	„ „	Staff.
H. Currie Collier	„ „	Staff.
John Edward Barker, M.B.	„ „	103rd Foot.
Jos. Ridge Greenhill	„ „	72nd Foot.
Hubert R. Greene	„ „	44th Foot.
Robert Henry Bolton	„ „	Staff
Henry Morris	„ „	Staff.
Philip P. Lyons, M.B.	„ „	Staff.
Edmund H. Condon, M.B.	„ „	Staff.
James Barker	„ „	1st Foot.
James Barry, M.D.	„ „	Staff.
Charles Alfred Atkens	„ „	Staff.
William Patrick Smith	„ „	Staff.
George Fearon	„ „	Staff.
Christopher J. Weir, M.B.	„ „	90th Foot.
Francis Howard, M.D.	„ „	Staff.
Frederick Jos. Byrne	„ „	Staff.
William Elgee	„ „	Staff.
Thomas White, M.B.	„ „	Staff.
Gordon Hammond, M.D.	16 Oct. „	Staff.
Alfred Lewis	24 Nov. „	Staff.
Thomas Moriarty, M.D.	24 Dec. „	Staff.
Tyler Oughton	24 Jan. 1864	Staff.
John Wallace, M.D.	31 Mar. „	Staff.
William Jobson, M.D.	„ „	Staff.
Joseph Fleming, M.D.	„ „	Staff.
Warner Atkinson	„ „	Staff.
Highgate Henry Phillips, M.B.	„ „	Staff.

ASSISTANT-SURGEONS—*continued.*

Name.	Date of Commission.	Service.
Thomas William Orwin	31 Mar. 1864	49th Foot.
Richard Charles Coleman Hickson	„ „	Staff.
Thomas Gardiner Bolster, M.D.	„ „	Staff.
Heinrich Friederich Lawaetz Melladew, M.D.	„ „	Staff.
John Middleton, M.D.	„ „	Staff.
Bernard James Finegan	„ „	2nd Bat., 2nd Foot.
David Arthur Leslie, M.D.	„ „	Staff.
Henry Skey Muir, M.D.	„ „	Staff.
John William Maxham, M.D.	„ „	Staff.
Robert Hyde	„ „	Staff.
Thomas Samuel Barrow, M.D.	„ „	2nd Bat., 23rd Foot.
Michael Cogan	„ „	Staff.
Richard Turner, M.D.	„ „	Staff.
Charles Fleetwood Churchill, M.B.	„ „	Staff.
Thomas Babington	„ „	Staff.
John Ambrose, M.D.	„ „	Staff.
James Atkinson	„ „	Staff.
John Anderson	„ „	Staff.
Francis Johnson, M.B.	„ „	13th Hussars.
Alexander Minty, M.B.	„ „	Staff
Patrick O'Connor	„ „	Staff.
George Atkinson, M.B.	„ „	Staff
James Burke	„ „	Staff.
John Gray, M.D.	„ „	Staff.
John Vicay Thatcher Malcolm, M.D.	„ „	Staff.
Thomas Moore Kirkwood	„ „	Staff.
Algernon Newbegin Watts	„ „	Staff.
Richard William Davies	„ „	Staff.
George Francis Dooley	„ „	Staff.
Robert Dunlop	„ „	2nd Bat., 10th Foot.
John Nugent Stock	„ „	2nd Bat., 9th Foot.
John Joseph Ball, M.D.	„ „	33rd Foot.
James George King	„ „	Staff.
Geo. Arthur Wellesley Wright, M.D.	„ „	Staff.
Arthur Mines Sperrin Lithgow, M.D.	„ „	Staff.
David Palmer Ross, M.D.	„ „	Staff.
John Joseph Verdon	10 April „	Staff.
Michael Finucane	24 May „	Staff.
Dawson Dean Heather	„ „	Staff.
Thomas William Wright	24 Sept. „	Staff.
William Hugh Jameson	30 „ „	41st Foot.
John Henry Connel Whipple, M.D.	„ „	1st Bat., 21st Foot.
William Winslow Tomlinson	„ „	1st Bat., 2nd Foot.
William Sparks Martin Price	„ „	73rd Foot.
George Frederick Duffy	„ „	1st Bat., 24th Foot.
Thomas Francis O'Dwyer, M.D.	„ „	1st Bat., 24th Foot.
John Peter Hamilton Boileau, M.B.	„ „	29th Foot.
William Carpenter, M.D.	„ „	26th Foot.
George MacIvor Campbell, M.D.	„ „	67th Foot.
John Frederick Foster	„ „	Staff.
Robert Alexander Farquharson, M.B.	„ „	Staff.
William Keir, M.D.	„ „	1st Bat., 16th Foot.
Laurance Corban, M.D.	„ „	49th Foot.
Francis Tuite, M.D.	„ „	Staff.
William Taylor, M.D.	„ „	Staff.
Parker Smith, M.D.	„ „	Staff.
John Mackenzie McLean, M.D.	„ „	2nd Bat., 12th Foot.
Pierce George Power, M.D.	„ „	Staff.
Peter Shepherd, M B.	„ „	Staff.
William Snowdon Hedley, M.D.	„ „	1st Foot.

ASSISTANT-SURGEONS—*continued.*

NAME.	Date of Commission.	Service.
Theobald Andrew Purcell	30 Sept. 1864	Staff.
Robert Davidson Kemp, M.B.	” ”	Staff.
Samuel Wesley Handy	” ”	Staff.
Edward O'Sullivan	” ”	96th Foot.
Albert Egerton Hale	” ”	Staff.
James McCreery	” ”	Staff.
Humphrey Carden Gillespie, M.D.	” ”	Staff.
Charles Spurway	” ”	Staff.
William McConnell, M.D.	” ”	Staff.
James Hector, M.B.	” ”	Staff.
William Lawton Eames	” ”	Staff.
Charles Edward Martin Shaw	” ”	Staff.
Arthur Dunn	” ”	Staff.
Valentine Stone	” ”	Staff.
Kennedy Macaw, M.D.	” ”	Staff.
William Edward Riordan	” ”	Staff.
Isidore Bourke, M.B.	” ”	Staff.
John Murray, M.B.	” ”	Staff.
James Bennett Kelly	” ”	Staff.
Daniel Charles Grose Bourns	” ”	Staff.
John Henry Hughes, M.D.	” ”	Staff.
John Wickliffe Jones	” ”	Staff.
Samuel Edward Walker	” ”	Staff.
Joseph Francis Blake	” ”	Staff.
Albert Benjamin Robinson	” ”	Staff.
David Arno Smet Thorburn, M.D.	” ”	Staff.
Eugene Robert O'Brien, M.D.	” ”	Staff.
James McCully, M.D.	” ”	Staff.
William Henry Jagoe	” ”	Staff.
Walter Blake	” ”	Staff.
Charles Smith	” ”	Staff.
James Duhy	” ”	Staff.
Edwin Philpot Haward	” ”	Staff.
Daniel Charles Grosse	” ”	Staff.
Frederick Hudd Dickinson, M.D.	” ”	Staff.
Samuel Doak, M.D.	” ”	Staff.
Samuel Flood	” ”	Staff.
George Beatty West	” ”	Staff.
Denis Joseph Canny	” ”	Staff.
Edmund Vallance	” ”	Staff.
John Candy, M.D.	” ”	Staff.
Joseph Bernard Ryan	” ”	Staff.
Coote Francis Hutchinson	” ”	Staff.
Edward Eustace	” ”	Staff.
Thomas John Peatfield	” ”	Staff.
John Robert Read Coulter, M.B.	” ”	Staff.
Charles Backhouse	” ”	Staff.
Espine Ward	” ”	Staff.
John Maturin	” ”	Staff.
David Renton, M.D.	” ”	Staff.
Charles Healey	” ”	Staff.

ROYAL MALTA FENCIBLE ARTILLERY.

Surgeon.—Ludovico Bernard, M.D. .. .. 9 May 1849
Assistant-Surgeon.—Carmelo Ellul, M.D. .. 9 Aug. 1849

APOTHECARIES AND DISPENSERS.

APOTHECARIES.

Name.	Date of Appointment.
John McIntosh	1 Sept. 1854
F. Fernandez	20 Feb. 1855
John Andrews	5 Dec. 1856
Frederick Philpot	21 Sept. 1860
Henry Logan Harvey	14 Jan. 1862

DISPENSERS.

L. Wallis	12 Oct. 1854
R. C. Mossman	12 Oct. 1854
E. Rickards	23 Nov. 1854
E. D. Thomson	23 Nov. 1854
D. W. Williams	23 Nov. 1854
J. Davies	28 Nov. 1854
R. G. Sampson	1 Dec. 1854
J. Collin	9 Feb. 1855
W. J. Barber	9 Feb. 1856
H. E. Barton	19 May 1855
T. A. Harrop	2 Oct. 1855
J. Bogie	20 May 1857

AN
INDEX
TO THE
AUTHORS OF THE ORIGINAL CONTRIBUTIONS
CONTAINED IN THE VOLUMES FOR
1859, 1860, 1861, 1862, and 1863.

In these Five Volumes are published (exclusive of the Reports of Heads of Branches), 127 original articles, contributed by *Two* (civilian) Professors of the Army Medical School,—*Five* Inspectors-General of Hospitals,—*Nine* Deputy Inspectors,—*Eleven* Surgeons-Major,—*Twenty-nine* Surgeons,—*Thirty-four* Assistant-Surgeons, and *Five* Medical Candidates.

These comprehend Forty-nine *Cases*,—Thirty-five *Sanitary* or *Topographical Reports*,—Twenty-one articles on *Medical*,—Seven on *Surgical*,—Six on *Chemical*,—and Nine on *Collateral* subjects.

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